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ABSTRACT

A review of the research on correspondence education with emphasis on its two-way communication aspects introduces this report on a series of studies designed to shed light upon problems related to the design and delivery of correspondence instruction. A total of 1,805 adult students enrolled in regular Swedish, Norwegian, and British correspondence courses of a secondary school or vocational training type were randomly assigned to experimental groups with (1) varying "submission density" (equivalent to varying length of study units); (2) varying numbers of assignment questions (omitted questions being replaced by self-check exercises); and (3) traditional postal instruction versus computer-assisted postal instruction. Data were collected through questionnaires, final tests, and a special student register. Results in the third series of experiments showed that the computerized postal instruction was experienced as more positive by the students than the traditional one. Students receiving computer-assisted correspondence tutoring started submitting more assignments than students receiving traditional tutoring by mail. In one of the two experimental courses, they also completed their studies more fully and more rapidly. Examples of postal two-way communication, computer-generated comment letters, and additional tables are appended, and a 13-page reference list is provided. (Author/LMM)

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JOHN A. BÅÅTH

POSTAL TWO-WAY COMMUNICATION IN CORRESPONDENCE EDUCATION

An empirical investigation

IR010 509

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Foreword

This study was carried out at the Department of Education at the University of Lund, as a part of the research project "Two-way communication in correspondence education". The project was initiated by the European Home Study Council (EHSC) and financed by the Bank of Sweden Tercentenary Fund.

Within the framework of the research project I have had the privilege of dealing with problems which are, to a substantial extent, related to my daily work at Hermods–nowadays LiberHermods. As a senior tutor during the sixties I found several indications that, through two-way communication by mail, a correspondence tutor could stimulate his students to remarkable progress, by means of constructive criticism, encouragement and personal involvement in the individual student's learning problems. At the same time, however, I noticed a clear tendency among correspondence schools to reduce the amount of postal two-way communication in their teaching systems. In one of my own courses–an upper secondary school course in Psychology–the number of assignment submissions was drastically reduced from 11 to 4. How would this affect the quality of the teaching and the students' learning experience?

On the other hand, as a course writer I was struck by the idea that it was possible to provide some kind of simulated two-way communication with the student *within* the course material, by means of exercises, questions, problems etc. with detailed model or specimen answers and comments. Could such simulated two-way communication, to any appreciable extent, replace the postal two-way communication brought about by assignments for submission?

A few years later, in the early seventies, I became responsible for a development project aiming at computer-assisted postal two-way communication in correspondence education. Would it be possible to provide good correspondence tuition with the aid of a computer?

Educational research can assume many different shapes. This study, in which I deal with the problems just mentioned, is an *empirical* one. However, well aware that "perceptions without concepts are blind" (Kant), I have tried to make my data intelligible by relating the problems and results of my study to concepts and principles of general didactics as well as to specific theoretical approaches to correspondence education–among them my own study from 1979, "Correspondence education in the light of a number of contemporary teaching models".

The present empirical study has an *experimental* design. As should be evident from my article "Research and development work in correspondence education", I definitely do not believe that an experimental approach is the only way to increase knowledge in this area. Apparently, however, the problems of this study lend themselves well to experimental methods. Nevertheless, studies designed differently–for instance using soft data from extensive interviews with a restricted number of correspondence students–could be a valuable supplement to the present investigation.

For the experiments, several research instruments have been used. Descriptions of the instruments with examples of questionnaire items are included in the study, as well as a few examples of tutor-marked and computer-marked students' assignments. Anyone interested in fuller documentation can contact the head of the project, Dr Rune Flinck (address: Department of Education, University of Lund, Box 7009, S-220 07 LUND, *Sweden*), or write direct to me (address: LiberHermods, S-205 10 MALMÖ, *Sweden*).

The Bank of Sweden Tercentenary Fund made the research project possible thanks to its substantial grant. LiberHermods has supported my work in many ways – by giving me a generously extended partial leave, by offering courses and administrative help for the experiments and, during the last phase of the work, by taking charge of the technical production of my thesis. I wish to express my special thanks to Mrs Erna Prior, Head of LiberHermods, and to Mr Nils-Ove Månsson, Fil.Kand. – not forgetting all my other colleagues at LiberHermods who have contributed in various ways.

One of the experiments was performed at NKS in Norway and another at RRC in England. I am most obliged to these two schools for all the time and work they invested in their respective parts of the investigation. I also wish to express my gratitude to the Swedish, Norwegian and British students who answered and returned the questionnaires and the final tests in addition to their ordinary study work.

At the Department of Education at the University of Lund, both Professor Ingvar Johannesson and his successor, Professor Göte Klingberg, have followed my work with interest and stimulated it in various ways, for which I am most grateful.

No other single person has contributed so much to this study as the head of the research project, Dr Rune Flinck, who has done invaluable work as administrator, as a stimulator, and as a critic. For all this I am greatly indebted to him. I also want to thank the other members of the research team, particularly Mrs Agneta Wångdahl, Fil.Kand., for help, inspiration, and good comradeship.

Among my other colleagues at the Department of Education, I want first of all to express my gratitude to Dr Ingar Bratt, who improved my English substantially, encouraged me and made a lot of valuable suggestions for revision of the text. My special thanks are also due to Docent Horst Löfgren and Dr Birgitta Willén, who have followed my work with great interest and given much good advice and support.

With most commendable patience, Mr Bo Zöger, Fil.Kand., helped me with the statistical data computing operations. I thank him very much for this.

Many colleagues in EHSC, CEC and ICCE have shown their interest in the project and made valuable comments on the work. In particular, I wish to express my gratitude to Dr Jan Byström, until recently at Brevskolan, Stockholm, Professor Börje Holmberg, Director of the Institute for Research into Distance Study, Fernuniversität, Hagen, Dr Kari Lampikoski, Head of Research and Development, Markkinointi-Instituutti, Helsinki, Mr Erling Ljoså, Educational Director of NKS, Oslo, Mr Keith Rawson-Jones, Director of the Educational Research and Development Division, Linguaphone, London, and Mr Torstein Rekkedal, Head of Research and Development, NKI-Skolen, Stabekk.

Last, but certainly not least, I wish to thank my wife and my children for their persevering support during my long-drawn-out work.

John A. Bååth
November 1980

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Part I: Background and aim

1 Introduction

1.1 An organizer

The subject of this thesis is correspondence education, one variety of distance education. A major problem area of correspondence education is the two-way communication by mail between student and correspondence tutor. This two-way communication is normally induced by assignments for submission, which the student has to work out in order to get his solutions corrected and commented on by his correspondence tutor.

Various ways to improve and/or to simplify the contacts between student and tutor have been investigated in the research project "Two-way communication in correspondence education". The present thesis was worked out within the framework of this project.

The following three problem areas will be considered in detail:

1 the *submission density* of assignments in correspondence courses: Does it make any difference (in terms of course completions, students' attitudes etc.) if we increase or decrease the number of submissions in a course? In other words: Is the proportion between the number of preplanned mail contacts and the length of a correspondence course of any importance?

2 the *quantity of assignment questions* per submission: Would it make any difference (in terms of course completions, students' attitudes etc.) if we replace a substantial number of assignment questions intended for submission, by self-check exercises within the course material?

3 the *type of two-way communication* by mail: Could a system using multiple-choice questions, computer-processing of the students' answers, and computer-printed tutorial comment letters, work as well (in terms of course completions, students' attitudes, etc.) as the traditional postal two-way communication between student and correspondence tutor induced by the traditional kinds of assignment questions?

The three problems mentioned have all been studied by an experimental approach.

Before proceeding to the experiments, I will try to introduce correspondence education both in general (the remaining parts of *chapter 1*) and—with regard to certain aspects relevant to the experimental studies—also somewhat more in detail (*chapter 2*). Finally a more precise delineation of the purpose of the empirical investigation will be given (*chapter 3*).

The overall aim of the presentation of correspondence education in chapters 1 and 2 is to introduce concepts, facts, and principles that are immediately relevant to the specific didactic problems which I have studied empirically. Therefore, essential topics at a macro-level, like the role and functions of correspondence education in society, are either not discussed at all in this thesis or just briefly touched upon.

1.2 The concept correspondence education

Correspondence education is the oldest form of distance education. Instead of the term "correspondence education", synonyms like "postal tuition" and "tuition by mail" can be used in order to emphasize that the communication between student and teacher/school is normally maintained by post. (Cf. Swedish "korrespondens-undervisning", but also "brevundervisning".)

NILSEN (1974) provides the following definition of correspondence education:

> Correspondence education is an educational form distinguished by two-way distant communication between teacher and learner by means of stored [*lagret*] information. (NILSEN, 1974, p. 54; translated from the Norwegian)

In this thesis the term *correspondence education* will be used according to Nilsen's definition. It will, consequently, refer to those forms of systematic, organized learning opportunities which are characterized by the occurrence of

1 *two-way communication* between student and teacher
2 *at a distance*
3 by means of *"stored" information* (i.e., handwritten or typed letters, printed texts, various kinds of pictures, discs or audio tapes, etc.).

By the insistence on *two-way* communication, the concept correspondence education is distinguished from such forms of distance education where all communication is directed from teacher/school to student (e.g., teaching only by means of correspondence course material, programmed instructional material or other kinds of self-study material; teaching through radio and TV). In addition, the qualifier *"stored* information" differentiates correspondence education from forms of distance education which imply simultaneous two-way communication (e.g., by means of a telephone). See *figure 1*.

		Type of communication	
		One-way	Two-way
Mediation	By stored information	Teaching by means of various kinds of self-study material	*Correspondence education*
	Simultaneous	Radio and TV teaching	Telephone teaching Computer-assisted teaching on line

Figure 1. Various forms of distance education

In order to avoid misunderstandings, the wording "*pure* correspondence education" will sometimes be used instead of just "correspondence education". This will be the case, particularly, in contexts where correspondence education alone is contrasted with correspondence education combined with telephone tutoring and/or face-to-face contacts.

1.3 The origin of correspondence education

The origin and early history of correspondence education has been explored only to a very limited extent.

In 1728, a certain Caleb Philipps concluded an advertisement concerning instruction in shorthand with the following passage:

> N.B. Any Persons in the Country desirous to Learn this Art, may by having the several Lessons sent Weekly to them, be as perfectly instructed as those that live in Boston. (BATTENBERG, 1971, p. 44)

This text has been regarded as the first known reference to correspondence education (BATTENBERG, 1971). However, it is not at all clear that the instruction mentioned actually included *two-way* communication between learner and teacher. Nor is there any evidence that the distance teaching activity referred to was really established.

Previously, 1856 was often stated as the starting year of correspondence education (e.g., NOFFSINGER, 1926). In this year Langenscheidt and Toussaint in Berlin published their first distance study course in foreign languages. It has now been demonstrated, however, that "Methode Toussaint-Langenscheidt" can hardly be regarded as correspondence education proper (SOMMER, 1965; DELLING, 1978). No assignments for submission were included, nor were any other means of *two-way* communication between learner and teacher provided by the publisher of the self-instructional material. Certainly the students had a formal possibility to send written questions to the publisher, but they were by no means encouraged to do so (*Methode Toussaint-Langenscheidt*, 1901?, p. 10).

However, there were forerunners of the correspondence education of today as early as in the first part of the nineteenth century. So far, the oldest recognized document of correspondence education, as it has been defined here, seems to be an advertisement by a private teacher and author of textbooks in English, A.J. Meuller (or A.F. Meuller), in the Swedish weekly Lunds Weckoblad, no. 30, 1833:

> *A Card*
>
> The undersigned respectfully intimates to those Ladies and Gentlemen, in the adjacent towns, who study Composition through the medium of the *Post* that the Address for the month of August, will be Little Gray Friars Street, Lund. A.J. Meuller. (BRATT, 1977, p. 161)

The teaching mentioned in this advertisement apparently fulfils all three criteria of correspondence education, not only teaching *at a distance* by means of *stored information* ("... through the medium of the Post ..."), but also *two-way* communication—communication from the learner to the teacher, as well as from the teacher to the student—otherwise the announcement of the teacher's address would have made no sense. In addition, the advertisement evidently refers to an activity which is already established and in progress.

No doubt, two-way communication was a most essential element in the correspondence teaching started in 1840 by the English teacher of shorthand, Isaac Pitman. It is interesting to note that this event coincides with the introduction of the uniform penny postage in England (HOLMBERG, 1960, p. 3).

Teaching by correspondence is a didactic activity with several different roots. In his thorough analysis of correspondence education, PETERS (1973, pp. 54–107) mentions the following ones:

1 *handwritten instruction*
   a instructional correspondence by mail
   b written communication between teacher and student in classroom teaching
2 *teaching by means of printed material*
   a handbooks, textbooks, self-study material
   b (instructional parts of certain) newspapers and journals.

Distance teaching by means of handwritten letters (1a) has a long tradition, from ancient times (cf. GRAFF, 1967). According to HENNINGSEN (1969), the class-

room teacher's written corrections of and comments on his students' written exercises (1b) is another essential root of correspondence education. A long development of printed instructional material (2a) preceded the occurrence of the first "letters" of a correspondence course. In one case, at least, a correspondence school developed directly from a Readers' Queries in a newspaper: International Correspondence Schools in Scranton, Pennsylvania, established in 1891 (*The Workingman's school*, 1971).

DELLING (1978) has tried to show schematically how correspondence education arose as a result of the convergence of two different lines of development, partly similar to those mentioned by PETERS (1973): one starting from *personal correspondence by mail*, the other from *self-study by means of any literature available*. See *figure 2*. As Delling points out himself, the graph does not claim to provide a complete picture of the roots of correspondence education; the role of textbooks, e.g., is not explicitly indicated (ibidem, p. 16). In addition, the written communication between teacher and student in classroom teaching (cf. Peters, 1b) has not been included by Delling.

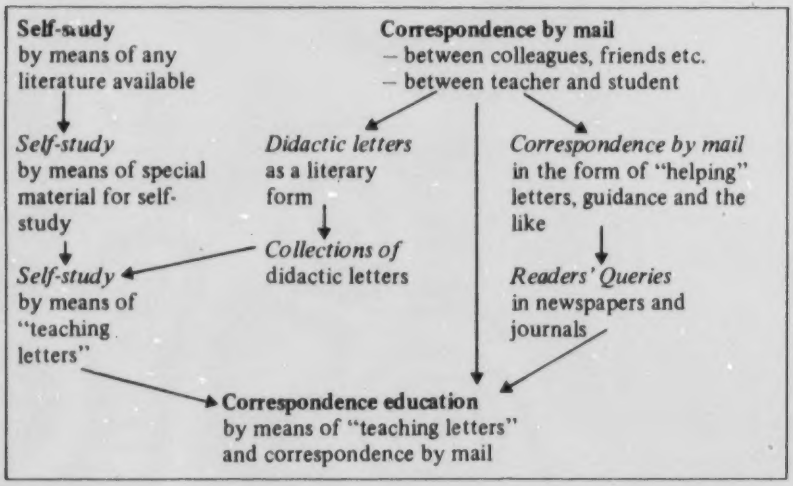


Figure 2. Lines of development, leading up to correspondence education. After a sketch by DELLING (1978, p. 16); reproduced here with slight editorial modifications

1.4 The development and various forms of correspondence education

Correspondence education, as it arose through the merging of different lines of development, normally includes the following two main components:

- teaching by means of preproduced (generally printed), more or less self-instructional *teaching material*
- teaching by means of *postal two-way communication* at a distance between student and correspondence tutor.

The latter component may be divided further into two parts:

– the processes of the student solving assignments for submission and the corre-

spondence tutor correcting and commenting on the student's solutions
– other varieties of instructional correspondence – e.g., the tutor's replies to questions or comments from the student, often occasioned by the tutor's corrections and comments but also referring directly to the study material.

This means that, as a rule, the learner first studies a certain portion of a specially prepared correspondence course material (*phase 1*). Then he solves a number of assignment problems given at the end of this portion and mails his solutions to the correspondence school, where they are checked and commented on by his tutor. After the student has got his solutions back and has revised this portion of the study material according to his results and the tutor's recommendations (*phase 2*), the study unit is, in many cases, concluded on his part. He may, however, penetrate the subject further by asking questions, commenting on the tutor's comments, etc., which gives rise to added activity from the tutor (*phase 3*). It is thus possible to distinguish between three phases of correspondence education (LEMBCKE, 1966). Good examples of instructional correspondence in the form of tutor's replies to students' questions are provided by EIFERT (1978).

BYSTRÖM (1976) has shown that, in practice, the educational activities of Swedish study circles are carried on in considerably varied ways. The same applies to correspondence education (BÅÅTH, 1976b). A tentative categorization of main forms of correspondence education (BÅÅTH & WÅNGDAHL, 1976) is shown in *figure 3*.

		Preproduced study material (= M)	
		Little weight (–)	Great weight (+)
Student-tutor dialogue (= D) by mail	Little weight (–)	M – D –	M + D –
	Great weight (+)	M – D +	M + D +

Figure 3. A categorization of principal types of correspondence education, according to BÅÅTH & WÅNGDAHL (1976, p. 11). (Slightly adapted)

The four principal types can be shortly described as follows:

TYPE M–D– This is the *"Material minus, dialogue minus"* type. Little weight is attached to the didactic design of the study material. For instance, available textbooks may be used with only a minimum of instructions on how to study them. A corresponding negligible weight is attached to the two-way communication by mail. The assignments for submission may be given on very rare occasions, and/or they may be corrected and graded almost completely without comments, and/or there may be very limited opportunities for the students to ask questions or to discuss problems with the tutor. In this type, correspondence education is not much removed from pure self-study.

TYPE M+D– Great weight is attached to the teaching functions of the study material. If available textbooks are used, a detailed study guide is designed, with explanations, self-check exercises etc. If not, fully integrated, didactically structured self-contained correspondence course material is worked out (cf. LJOSÅ, 1975b, p. 113). The two-way communication element is not considered important to a comparable extent, however. This *"Material plus, dialogue minus"* type of correspondence education is not much removed from self-study by means of self-instructional material.

TYPE M–D+ The third type is the reverse of the previous one. It can be called the *"Material minus, dialogue plus"* type, since great weight is attached to the individual tutoring by mail, whereas the study material used is only slightly adapted to distance study.

TYPE M+D+ In the *"Material plus, dialogue plus"* type, both elements are given a comparatively great weight, the didactic design of the teaching material as well as the two-way communication by mail between student and tutor.

In many works on correspondence education, the "Material plus, dialogue plus" type stands out as the ideal type of this form of teaching (e.g., ERDOS, 1967; HOLMBERG, 1974). As will be seen, practice varies, however.

Correspondence education apparently started as small-scale enterprises: individual private teachers broadened their activities to include also teaching by mail, e.g., Meuller and Pitman (see above, 1.3) and, later on, pioneers like W.R. Harper in USA (NOFFSINGER, 1926) and H.S. Hermod in Sweden (GADDÉN, 1973). However, many correspondence schools developed into comparatively large enterprises. In the nineteen sixties, at least three correspondence schools registered more than 100,000 new applicants a year: International Correspondence Schools, USAFI, and Hermods (*The Workingman's school*, 1971; MACKENZIE ET AL., 1968; GADDÉN, 1973). Nowadays, the three largest correspondence teaching institutions of the world are probably the US Air Force Extension Course Institute (ECI), the State-owned French Centre National de Télé-Enseignement (CNTE) and the recent International Correspondence Institute, centered in Brussels and run by the international Pentecostal Movement (FLETCHER, 1980; WEINSTOCK, 1976?; ANDERSON & CARTER, 1979).

Yet, all correspondence education of today cannot be characterized as a large-scale activity. Above all, extramural correspondence teaching provided by university departments is often given on a comparatively small scale. Partly as a consequence of this the departments normally pay greater attention to the two-way communication element than to the didactic design of the study material. The reverse often applies to private correspondence schools (KEMPFER, 1973, pp. 34–36). This would mean that private correspondence schools (and the like) tend to approach the *M+D–* type of correspondence education, whereas university departments rather tend to approach the *M–D+* type.

Nowadays, correspondence education is only *one* of several different forms of distance education, e.g., radio and TV teaching and telephone teaching. Not seldom are various forms of distance teaching combined, for instance correspondence education with radio and/or TV teaching (see FLINCK, 1976a). Combinations of correspondence education and telephone teaching are also being explored (FLINCK, 1978).

In addition, correspondence education is often combined with some kind of face-to-face contacts (WÅNGDAHL, 1977). The British Open University is, in principle, a correspondence study university. Its correspondence teaching is, however, combined not only with radio and TV programmes but also with various kinds of face-to-face contacts. Still, in most Open University courses both radio and TV programmes and face-to-face contacts are optional (FLINCK, 1976a). The opposite is a rule in states belonging to the Eastern bloc where correspondence education is regularly combined with compulsory face-to-face meetings (see, e.g., *Correspondence study (USSR)*, 1971). Distance education at Swedish universities and other Swedish institutes of advanced studies is always arranged as a combination of face-to-face sessions and one or more forms of distance education–among them often two-way communication by mail, i.e. correspondence education (FLINCK, 1976b; WILLÉN, 1978).

Nevertheless, pure correspondence education still appears to be a common form of distance education, above all in Western Europe (BÅATH, 1976b) and in the United States (MACKENZIE ET AL., 1968).

1.5 The extension and varying status of correspondence education

Correspondence education is now spread all over the world – not only in industrialized countries but also in developing ones (see, e.g., EDSTRÖM ET AL, 1970; KABWASA & KAUNDA, 1973; SINGH, 1978).

Completely reliable information on the number of students etc., is difficult to obtain. Still, the following data may provide an idea of the size of the correspondence teaching activities.

According to a probably rather conservative estimation by MACKENZIE ET AL. (1968), there were about 3 million correspondence students in the USA in the middle of the nineteen sixties. Towards the end of the same decade apparently about the same number studied by correspondence in the USSR, among them nearly 1,8 million at the tertiary level and about 1,2 million at the secondary level (WEINSTOCK, 1976?, p. 450).

KAROW (1980) reports estimated numbers of correspondence students during the middle part of the seventies in some European countries. The figures refer to correspondence education arranged by private correspondence schools. This means that, e.g., the students of CNTE are not included in the French statistics. See *table 1*.

As late as during the nineteen sixties, Sweden and Holland stood out as the leading countries of the world as regards density of correspondence students (e.g., PETERS, 1965). As can be seen in table 1, Norway has since then by far surpassed these two countries. The causes of this change may, to a substantial degree, be found in different public approaches in the area of adult education. That problem will be treated further later on in this section.

Table 1. Participants in correspondence education, arranged by private schools, in a number of European countries round 1975, according to KAROW (1980, p. 300)

Country	Inhabitants (millions), ca.	Students per 100,000 inhabitants
Norway	4	5,000
Finland	4.7	1,490
Holland	13.6	1,260
Sweden	8.2	1,220
Great Britain	56	890
Spain	35	660
Belgium	10	650
Switzerland	6.4	630
France	52.7	620
Austria	7.5	570
Denmark	4.9	510
West-Germany	62	160
Italy	54	150

The high density of students in Holland demonstrates that *correspondence education is by no means only a phenomenon of sparsely populated areas.* Holland is one of

the most densely populated countries in the world. It can be added that in several other countries, e.g., England, correspondence schools have proportionally more students from large and medium large cities than from areas with fewer inhabitants. Obviously, geographical factors have no decisive influence on the choice of correspondence study (e.g., WEDELL, 1970; see further, section 2.3.3).

To a high degree, *the history of correspondence education is a story of a struggle for recognition* by public authorities as well as by the educational establishment. This is evident from the vast number of debate articles and apologetic pamphlets reported in bibliographies like CHILDS ET AL., (1960) and DELLING (1977). It is significant that, in the collection of essential texts on correspondence education published by MACKENZIE & CHRISTENSEN (1971), one section carries the heading "The enigma of academic acceptance", and that one of the contributions to this section is headed "Must home study be a stepchild of education?" (home study = correspondence education).

One possible explanation is that, in the Western World, correspondence courses have most often been arranged by private enterprises. Quite probably, this fact may have contributed to screening off correspondence education from the established educational system and from the educational researcher's perspective. Another explanation might be the orally lecturing university teachers'/researchers' distrust in a form of teaching where the spoken word is not used and where the teacher is not even physically present among his students.

KAROW (1980) points to the strong neo-humanistic tradition within the German educational system as a likely factor contributing to the resistance to correspondence education in Germany. In Denmark, Grundtvig's notion of "the living word" may have played a similar role (SAXE, 1977). As regards Great Britain, HARRIS (1971) points out–among other things–the antagonism between the aim and direction of the traditional adult education and the purpose of most correspondence education which is evident in that country:

> Adult educators who have long been preoccupied with the definition of adult education in terms confined to non-examinable and non-vocational liberal study have frequently neglected correspondence education, without even observing the large amount of non-vocational, liberal, cultural and recreational study served by it. (HARRIS, 1971, p.3)

That correspondence education can provide good instructional effects, in terms of preparation for future work or higher studies, has been shown in investigations by WOOLSEY (1974) and NEUMANN & MÜLLER (1976), and also, more informally, by GADDÉN (1973). Several leading Swedish scientists, authors, politicians and administrators have received their secondary education–or a major part of it–by means of correspondence study. LANDQUIST (1948, p. 201) maintains that in Sweden correspondence education has ". . . to a considerable degree furthered social mobility [*ståndscirkulation*] in the upwards direction . . .".

At least during three decades–from the nineteen forties to the end of the sixties –Sweden was also a country where correspondence education enjoyed an unusually high reputation. A sign of the favourable attitude of the public authorities was their giving in 1958 to Hermods–which was then a private, although non-profit making, foundation–the status of an officially recognized examining body for secondary school levels. Some years later the same school, in cooperation with the Swedish Board of Education and the Swedish Broadcasting Corporation, was commissioned to train all primary school teachers and all teachers of mathematics in the lower secondary schools in the "new mathematics" (the Delta project; see e.g., HOLMBERG, 1974, pp. 47–52; *Distance education*, 1976, p. 23).

Through the Swedish adult education reforms during the sixties, particularly the bill 1967:85, practically all adult education in Sweden was made free of charge or

highly subsidized. However, with the exception of the Swedish State Schools for Adults (SSV) in Norrköping and Härnösand, no attention was on this occasion paid to correspondence education. This "injustice within adult education" (LARSSON, 1978, p. 7), which is not yet eliminated, has most probably contributed largely to the severe quantitative decline of Swedish correspondence education since the end of the sixties.

As a contrast, the Norwegian government has given correspondence education substantial support during the seventies (*Regler för statstilskott til brevundervisning*, 1977), which may explain the increasing number of correspondence students in this country during recent years.

WEINSTOCK (1976?) distinguishes between three different types of correspondence education:

1 *The liberal system*, where correspondence education is exclusively, or for the most part, organized by private commercial enterprises. Examples: USA, Great Britain, West-Germany, and (except CNTE) France.

2 *Private institutions for the benefit of everyone.* This type is exemplified by the Scandinavian countries and Holland, where correspondence education is also based on private initiative but where, to a higher degree than within »the liberal system», correspondence schools have grown into institutions that benefit a general public.

3 *Correspondence education in the Socialist countries*, where it is exclusively carried on by the public authorities.

What has been said previously about the history of correspondence education as, largely, a struggle for recognition refers mainly to the first two types. In the Socialist countries the situation is different. In the USSR, for instance, correspondence education (regularly combined with face-to-face meetings) has apparently gained a very strong position:

> . . . le facteur décisif est sans doute l'encouragement systématique de l'enseignement par correspondance qui n'a pas, en U.R.S.S., le statut subordonné qui lui est attribué en Occident. Tout est mis en œuvre pour faciliter l'étude à distance. L'enseignement par correspondance est fondé sur le principe de la gratuité non seulement en ce qui concerne les cours mais aussi les fournitures (manuels, matériel didactique) envoyés sur simple demande. (WEINSTOCK, 1976?, p. 452)

It should be added that, during the seventies, a renewed interest in correspondence education has emerged around the world. In particular, this applies to correspondence study at tertiary level (Open University, Fernuniversität etc.). However, due to the new emphasis on permanent education (lifelong learning) and, especially, on *recurrent education* of people in rapidly changing societies, correspondence education stands out as a most interesting alternative in adult education also at secondary level and—not least—in the area of vocational training (e.g., WEDELL, 1970). In addition, the strained economic situation of many countries at present and the growing insight into the limitations of the global resources also favour comparatively cheap forms of adult education like correspondence teaching.

1.6 Some basic terms

Before leaving this introductory chapter it might be suitable to define a number of basic terms as they are used in this thesis. Some of them appear in the literature of correspondence education but are there used in various ways. Other terms are inventions of mine. Therefore, the definitions should be regarded as stipulatory: their

main purpose is to stipulate the usage of these terms in the present thesis. The terms will be given in alphabetical order.

Assignments for submission. The correspondence education of today is normally carried on by means of (1) learning material for self-study, and (2) postal two-way communication between student and correspondence tutor. This two-way communication is most often induced by assignments for submission, given to the student at the end of each study unit. The student is supposed to submit his solutions to the scrutiny of a correspondence tutor, most often by sending them to the correspondence school.

Completers are correspondence students who have completed their course, i.e., sent in their solutions of the assignments for submission given in each one of the study units constituting the correspondence course.

Computer-assisted two-way communication. It is possible to computerize all parts of the correspondence tutor's work that can be programmed beforehand—i.e., all routine corrections and comments on students' solutions. If the student is not in direct contact with the computer but receives computer-printouts by mail, the communication is said to be *off line*. In the future, computer-assisted two-way communication *on line* may supplement correspondence education; in this case, the student is in direct contact with a computer, e.g. by means of a telephone and a TV receiver.

Correspondence education is a form of distance education distinguished by two-way communication at a distance between a learner and a teacher by means of stored information (cf. p. 12).—Synonymously: *pure correspondence education, correspondence instruction, correspondence teaching, correspondence study.*

Correspondence tutor refers to the teacher who maintains the two-way communication at a distance with the correspondence student. At many correspondence schools, the major task of the correspondence tutor is to correct and to comment on the solutions that the students have given to their assignments for submission. Normally, however, he or she should also reply to students' questions and comments, which may give rise to extensive dialogues by mail.

Course writers are those who prepare the correspondence course material intended for self-study. They are usually assisted by a course editor, or (e.g., at the Open University) by a whole course team, at the correspondence school.

Distance education includes all educational forms where learner and teacher are physically separated from each other. The communication between them—one-way or two-way—has therefore to be maintained with the aid of one or more media for distant transmission of stored or simultaneous information. (Cf. figure 1, section 1.2)

Dropout means a correspondence student who has not completed his or her course, i.e., has not sent in solutions of the assignments for submission in *all* the study units of the correspondence course. (Cf. *completers.*) The concept dropout thus includes the concept *non-starter* (see this term). In practice, it is often difficult to determine when a correspondence student should be regarded as a dropout, since many correspondence schools leave their students considerable freedom with regard to time schedules. In the experimental studies reported in this thesis, students who—in the sense above—had neither completed their course, nor sent in any solutions during the last six months, were regarded as dropouts.—Synonymously: *non-completer.*

Gross study time, see *study time.*

Net study time, see *study time.*

Non-completer, see *dropout.*

Non-starter is a person who has applied for a correspondence course but who has never started to send in any solutions of assignments for submission to the correspondence tutor (correspondence school). Non-starters are included in the numbers of non-completers or dropouts (see the latter term).

Self-check exercise, self-check test. These two synonyms refer to all kinds of questions, exercises, problems etc. within the correspondence course material, which the student should deal with on his own – i.e., he is not expected to send in the answers, solutions etc. to the correspondence tutor (correspondence school).

Starter is a correspondence student who has sent in solutions of the assignments for submission in at least the first study unit of the correspondence course. (Cf. *non-starter.*)

Study time. The time used by a student to finish a correspondence course can be defined in two different ways, as gross study time and as net study time. *Gross study time* covers the whole time that elapses from the student's application for the course to his or her completion of it. It is calculated in weeks. *Net study time* refers to the actual time that the student has spent studying the course, and is calculated in hours.

Study unit. A correspondence course is divided into study units. Each study unit is concluded by a series of assignments for submission (see this term).

Submission density. This term refers to the proportion between the number of occasions for submission of assignments in a course and the length of the course. High submission density entails comparatively short study units, whereas low submission density is coupled to comparatively extensive study units (see this term).

Turn-round time. The *total* turn-round time of solutions of assignment problems is calculated in days. It is measured from the day when the student mails his or her solutions to the day when the student gets them back, corrected and commented on. on. This time is dependent on two factors: the postal services and the internal turn-round time. By *internal* turn-round time is meant the time that elapses from the arrival of the solutions to the correspondence school until they are returned to the student.

Two-way communication. By definition, correspondence education includes two-way communication between student and teacher, which means that information flows not only from the teacher to the learner (as in certain other forms of distance education), but also from the learner to the teacher. In pure correspondence education, all two-way communication is maintained by mail.—The two-way communication is *real* when there is actual correspondence between student and correspondence tutor, but it can also be *simulated*. In the latter case, the course writer has designed (parts of) the study material so as to simulate a teacher-student dialogue, e.g., by means of self-check exercises with model answers and comments. *Computer-assisted* two-way communication (see this term) may be regarded as a mediating form in between the real and the simulated ones.—As a supplement, correspondence education can utilize two-way communication maintained with the aid of the telephone or face-to-face contacts (in the latter case, usually in groups).

2 Correspondence education as an educational form

2.1 Research on correspondence education

Up to the end of the nineteen sixties, educational research paid extremely modest attention to correspondence education:

> It will remain a strange phenomenon in the history of education that educational scientists have neglected correspondence instruction almost entirely. (PETERS, 1971c, p. 223)

Although a number of empirical studies had been published since the nineteen twenties, large and essential parts of the area were–and still are–on the whole unexplored:

> The first [general observation concerning problems of teaching by correspondence] is that we badly need research on the methodology of teaching by correspondence. Practically no research has been carried on in this important area. (CHILDS, 1971a, p. 118)

The same applied at the time to the theoretical analysis of correspondence education:

> It is unfortunately true that the failures of correspondence study to develop a theory related to the mainstream of educational thought and practise have seriously handicapped the development and recognition of this field ... (WEDEMEYER, 1974, p. 3)

During the seventies, research on correspondence education–and on distance education on the whole–has become more frequent, however. Thus, about 20 doctoral dissertations from the USA were reported in *Dissertation Abstracts* during the seventies–nearly as many as are known from the earlier decades of this century. With few exceptions, these dissertations deal with correspondence education connected with universities, like most of the theses and reports published by the Open University, DIFF (Deutsches Institut für Fernstudien, in Tübingen), and Fernuniversität in Hagen (Nordrhein-Westfalen). At several places, however, research has also started during the seventies on the quantitatively considerably more important activities of correspondence education at non-university levels.

Surveys of previous research on correspondence education are provided by, among others, MATHIESEN (1971), DELLING (1977) and HOLMBERG (1977b). In 1977, the International Council of Correspondence Education (ICCE) published a survey of ongoing research and development work within its area (GRANHOLM & LJOSÅ, 1977).

The classical analysis of didactic problems and research topics with regard to correspondence education is a paper from 1962 written by CHILDS (1971a). Recent analyses of the need of research on correspondence education have been published by BÅÅTH (1978), HOLMBERG (1978), and LJOSÅ (1978b).

2.2 Theoretical approaches

Previous research on correspondence education had, on the whole, a narrowly empirical direction. PETERS (1973) is most critical to the majority of these studies which are mainly American:

> Überblickt man die Forschungslage ... so ist zu konstatieren, daß z.B. für die meisten amerikanischen Untersuchungen über die Wirksamkeit des Fernunterrichts ... ein ... naiv-empiristisches Vorgehen gerade karakteristisch war: ein relativ fortgeschrittenes statistisches Treatment bei völliger Theorielosigkeit. (PETERS, 1973, p. 17)

The most serious point of PETERS' criticism (ib., p. 17) concerns a type of studies in which students' achievements in correspondence education are compared with the achievements of students taking part in a different form of teaching–as a rule, conventional classroom teaching. In these studies, the "correspondence teaching" was most often not given at a distance but in a classroom. This makes the experiments artificial and reveals –according to Peters –a total lack of consideration of what distinguishes correspondence education from other instructional forms. On the artificiality of certain types of experiments on correspondence education, see further BAATH & REKKEDAL (1978).

The criticized lack of theory during previous decades is by no means a characteristic only of much research on correspondence education but also of a great deal of other educational research. It should further be mentioned that, since the middle of the sixties, a deeper consciousness of the need of theory has begun to appear also in the field of correspondence study. In the following parts of this section I will try to summarize a number of theoretical approaches to correspondence education as an educational form.

2.2.1 Some attempts to determine the nature of correspondence education

In an early theoretical approach, GRAFF (1965) characterized correspondence education as *"guided and controlled self-teaching"*. Correspondence instruction has been conceived in a similar way by PÖGGELER (1964; an organized form of "autodidactics") and BERDICHEVSKY (1975; "guided self-teaching"), among others.

HOLMBERG (e.g., 1960, 1974, 1978) stresses the teaching dimension of correspondence education. Already in his first treatise on the subject (1960, pp. 15–16) he distinguished *"guided didactic conversation"* as an essential trait of correspondence study. In later works (1977b, p. 95–97; 1978, pp. 29–37; 1980), HOLMBERG elaborates this idea. The conversational style characterizes both the simulated two-way communication which is built into the teaching material, and the real two-way communication which is achieved by mail. Thus, the teaching material used in a correspondence course differs from, e.g., conventional textbooks, and so there is a difference between the work of the correspondence tutor and, e.g., the marking of tests made by a classroom teacher.

In the presentation of his theory of guided didactic conversation, Holmberg hypothesizes a relationship between the traits that characterize such a conversation and the students' motivation and achievement: The more distinctly these traits are brought out in a correspondence course, the stronger motivation and the better s study results can be expected.

No researcher has probably devoted himself so extensively and profoundly to the discussion of the essence of correspondence education as PETERS, particularly in his monumental dissertation "Die didaktische Struktur des Fernunterrichts" (1973). Peters maintains that the distinctive features of correspondence education cannot be exclusively determined by means of concepts derived from conventional didactic re-

search, which is adapted to classroom teaching. In his thesis, Peters therefore tries several different approaches. Most significant is his analysis of *correspondence education as an "industrialized" form of teaching*, which adds a radically new aspect to the concept correspondence education – and also to the more inclusive concept distance education (cf. KEEGAN, 1980).

When studying correspondence education – and distance education on the whole – from this point of view, Peters obviously disregards the small-scale activities of a "handicraft" type, carried on by the early pioneers of correspondence education (cf. section 1.3), as well as by many university departments arranging distance education today (e.g., in Sweden; cf. section 1.4). Peters deals with a much more widespread type of correspondence education (and distance education on the whole) – the one that can be characterized as a form of *mass education* (EDSTRÖM ET AL., 1970). To this large-scale type he applies the various attributes of industrialization. He finds 14 traits which correspondence education has in common with industrialized processes, among others the following (cf. PETERS, 1971c):

- rationalization
- careful planning
- considerable division of labour
- mechanization and automation of certain functions
- mass production
- assembly line principle for certain functions
- formalization
- concentration and centralization.

All correspondence education that is run on a comparatively large scale implies thorough planning of the instruction. Owing to the distance in space and time, which necessitates indirect contacts, and owing to the "industrialized" conditions of operation, it is difficult, if not impossible, to improvise in the same way as can be done in classroom teaching (cf., e.g., BÅÅTH, 1979, pp. 22, 95). Consequently, as a rule, most teaching elements must be determined beforehand and "objectivated" (DOHMEN, 1970) in study material, assignments for submission and directions to the correspondence tutor. An educational technology approach to correspondence instruction therefore appears most reasonable (PETERS, 1973). Related to this idea is the systems approach. Analyses of correspondence education as a system have been provided by HOLMBERG (1969, 1977b), DELLING (1971), ERDOS (1975a, 1975b), GRAFF (1977, 1978a), and ØSTLYNGEN (1979), among others.

As an illustration of the division of labour principle, Peters tries to demonstrate that, in correspondence education, the functions of the "pre-industrial" classroom teacher are distributed among a number of different "instances": preproduced teaching material, correspondence tutor, councellors, etc.

Peters mentions several advantages of this division of labour. For instance, the correspondence tutor is, on the whole, relieved of the function of information giving. This gives him an opportunity to concentrate on other important teaching functions, such as motivating the students, giving them individual learning support and – of course – controlling their progress.

On the other hand, there is a risk that the far-reaching division of labour and the specialization that it has in its wake may lead to alienation on the part of the correspondence tutor:

> Ein ursprünglich spontaner, den ganzen Menschen in Anspruch nehmender, nicht selten auch kreativer Arbeitsprozess verwandelt sich für viele Beteiligte in eine repetitive und mehr oder weniger monotone Teilarbeit. (PETERS, 1973, p. 210)

2.2.2 To which kinds of goals is correspondence education suited?

Among other issues, PETERS (1973) also analyses the "intentionality" (Intentionalität) of correspondence education. Is it, for instance, possible to teach all subjects by correspondence, to reach all kinds of learning objectives?

In his discussion of when to use correspondence education, NILSEN (1974) makes a summary relevant to this question:

> Correspondence education *may* be used . . .
> for all cognitive learning objectives,
> for affective learning objectives where the information method is practicable
> for psychomotor learning objectives where information and exercises can be stored and sent, and this is sufficient.
> (NILSEN, 1974, p. 150; translated from the Norwegian)

Similar conclusions are drawn by PETERS (1973, pp. 110–113), as well as by HOLMBERG (1976a; 1977b, pp. 24, 48) and BÅATH (1979, pp. 95–98). An educational form based on the written word appears to be comparatively well suited to most kinds of *cognitive* learning objectives. Certain types of *affective* and *psychomotor* objectives (to use the terms of BLOOM, 1956) are, however, more difficult to attain by means of pure correspondence education.

With regard to affective objectives, it may for instance be rather problematic to learn social attitudes efficiently without being able to perform social behaviour with feedback. As concerns psychomotor objectives, the same applies to the training of motor skills, the practice of which does not result in a product, open to feedback from the correspondence tutor—e.g., the practical elements of car driving (cf. BÅATH, 1979, pp. 96–97).

2.2.3 The autonomy of correspondence students

According to WEDEMEYER (e.g., 1971, 1976), correspondence education is a form of *independent study* with inherent possibilities to let the student gain knowledge on his own, independent of the limitations of classroom teaching.

In the spirit of Wedemeyer, DELLING (1975, 1976) advocates as open forms as possible in the case of correspondence education (and distance education on the whole). No correspondence school should, e.g., force a time schedule on its students. Nor does it make any sense, DELLING (1975) maintains, to assess the achievements of a correspondence student by means of conventional criteria like course completion and grades. The only thing that matters is that the student attains his or her goal, which may coincide neither with the extent of the course nor with the test by means of which the school evaluates the students' learning results. Therefore, correspondence schools should only work as "helping organizations", an idea which reminds us of ROGERS (1969) notion of teachers as "facilitators of learning".

No doubt, correspondence education *could* be arranged in this way (cf. BÅATH, 1979, pp. 76–79). As a rule, however, the correspondence students' freedom is rather restricted (CHILDS, 1971a, p. 112; BÅATH, 1976a; 1979, p. 75). Like most other adult students, they can choose their courses within the limits presented by the offer of the schools available. Unlike most other adult students, they can also choose time and place, in many cases even rate, for their studies. Nevertheless, in a correspondence course there is seldom room for alternative learning objectives, nor for different ways of attaining the established goals. Normally, all course takers study the same material and are supposed to do it in about the same way. Their achievements are also assessed by means of identical evaluation instruments. However, means of adapting the teaching to the students' varying needs and wishes are inherent in the postal two-way communication with the correspondence tutor.

MOORE (1973, 1975, 1977) uses two major dimensions, *autonomy* and *distance*,

in his theory of independent study and "telematic teaching" (= distance teaching). Students may be more or less autonomous, self-directing, in their studies, and teaching may vary with regard to "distance". According to Moore, "distance" is a function of two variables, dialogue and structure. The extent to which the teaching permits two-way communication between student and teacher determines its degree of *dialogue*. *Structure* refers to the degree of rigidity that characterizes the teaching. The lower structure, the greater freedom is left to the student.

In accordance with what was said above about the usually restricted freedom in correspondence education, Moore characterizes this form of "telematic teaching" as *moderately distant*. It provides possibilities of dialogue, but the structure of correspondence courses is, as a rule, rather firm.

Various practical possibilities of providing greater freedom of choice within the framework of a correspondence course have been suggested in a paper by LJOSÅ & SANDVOLD (1976).

2.2.4 Correspondence education in the light of contemporary teaching models

In a theoretical study (BÅÅTH, 1979), I tried to analyse correspondence education in the light of the following teaching models:

1 Skinner's behaviour control model
2 Rothkopf's model for written instruction
3 Ausubel's advance organizer model
4 Egan's structural communication model
5 Bruner's discovery learning model
6 Rogers' model for "facilitation of learning"
7 Gagné's general teaching model.

With regard to their basic conceptions of learning, models 1–6 represent a scale from extreme behaviourism to strict cognitivism, and, as concerns their proponents' views of teaching, from very strict control of the students' learning activities to an extremely high degree of freedom on the part of the learner. The last model–that of Gagné–incorporates elements from most of the other models.

Among the results of the study the following may be mentioned: *All seven models can be applied to correspondence education.* The stricter the control of the students' learning implied by the model, the easier and more natural the application. Open and comparatively open models like Rogers' and Bruner's require greater stress on the two-way communication element in correspondence education. They also make simultaneous contacts–by means of telephone or face-to-face meetings–more desirable as a supplement to the mail contacts than do models implying stricter control.

All teaching functions prescribed by Gagné's model can be provided for in pure correspondence education, if the learning objectives belong to the cognitive domains. Learning of certain kinds of attitudes and motor skills, however, appear to require face-to-face contacts as a supplement to the instruction by correspondence (cf. 2.2.2).

The choice of model should depend on one's basic view of education and learning, as well as on the variety/varieties of goals of the teaching planned. Economic and related frames must also be taken into consideration, especially with regard to *the choice between different applications of a model.*

From each model, a considerable number of practical implications–partly varying from model to model–can be made as concerns the design of the *teaching material.* The same applies to the organization of the *two-way communication* and the work of the correspondence tutor. However, common to the applications of all seven models is the demand on the tutor that he or she tries to adapt the teaching or certain parts of it to each student as an *individual.* This appears to be especially im-

portant *when a correspondence student is in the starting phase of his studies.* It would therefore be highly desirable that student and tutor, despite the physical distance, get to know each other – and do so at a very early stage.

2.3 The students

Extensive studies concerning participants in distance education at university level have been reported by HOLMBERG (1976b), MCINTOSH ET AL. (1976, 1980) and WILLÉN (1978), among others.

In this section, however, I shall confine myself to results of investigations on correspondence students studying courses mainly at secondary school level and vocational courses at somewhat varying levels. Data on such students have been reported as part of research studies with, generally, much broader aims. In very rough outlines, these data were summarized by WÅNGDAHL (1980) in the following way: The typical correspondence student is a man, 21–35 years of age. He has attained a slightly higher level of formal education than the average of the population, he has a full-time work (usually a white-collar job), and is married. He lives with wife and children in a densely populated area. He has begun his adult studies in order to improve his vocational education and, eventually, obtain a better job. He has chosen correspondence education for practical reasons: This teaching form enables him to study at his own rate and to adjust his time schedule to his work and his family.

Except for the last point – the reasons for choosing this specific teaching form – the typical correspondence student does not differ very much from the typical adult student in general (FLINCK, 1977; WÅNGDAHL, 1980).

In the remaining part of this section, the general picture which has now been drawn will be slightly nuanced.

2.3.1 Who are the correspondence students?

Sex. Previously, male students dominated correspondence education strongly. In recent years, however, the proportion of female participants has increased to a degree that makes a future levelling discernible (see, e.g., *Ett bidrag till beskrivning* . . ., 1976; GOORHUIS, 1977; WÅNGDAHL, 1979). Yet, it should be noted that the sex distribution varies markedly between different courses and correspondence schools, most probably also between countries (WÅNGDAHL, 1980) – which, moreover, applies to the following demographical variables as well.

Age. There is a tendency for the average age of correspondence students to increase. In two fairly broad Swedish studies during the seventies, the median age was found to be over 30 (*Ett bidrag till beskrivning* . . ., 1976; WÅNGDAHL, 1979) instead of below 30, which was normal before.

Domicile. As has been pointed out in section 1.5, correspondence education is by no means exclusively – or even predominantly – a phenomenon of sparsely populated areas. Most research on correspondence students shows a higher proportion living in urban areas (WEDELL, 1970; cf., e.g., REKKEDAL, 1972a, 1976; WÅNGDAHL, 1980).

Level of formal education. Naturally, the level of previous formal education varies with the level of courses studied. Generally, however, correspondence students tend to have a slightly higher educational level than the average of the population (WÅNGDAHL, 1980). This is hardly surprising, since traditional correspondence education demands a certain experience in assimilating printed texts as well as some training to express oneself in writing.

Occupation. Correspondence students normally have a full-time job. Clerks, skilled workers and foremen are common occupational groups among correspondence course takers (e.g., MACKENZIE ET AL., 1968; NEUMANN & MÜLLER, 1976; GOORHUIS, 1977).

Personality variables. According to a Swedish study, correspondence students tend to be slightly more flexible, less conventional and more interested in social problems than the average of the population (*Ett bidrag till beskrivning . . .*, 1976; cf. WÅNGDAHL, 1980). MOORE (1975) assumed a relationship between autonomy (defined as "field independence") and (1) participation in, as well as (2) attitude towards correspondence study. An empirical investigation (MOORE, 1976) verified the first of these two hypotheses, but not the second one.

2.3.2 Why do they study?

As a rule, the most important reasons to study a correspondence course seem to be vocationally oriented (e.g., ROSSI & JOHNSTONE, 1965; GLATTER & WEDELL, 1971; REKKEDAL 1976; cf. WÅNGDAHL, 1980). The student wants to be better qualified for his or her present job or to gain qualifications for a better one. Many students also use correspondence education to obtain entrance to higher studies. In all, this would mean that–like most kinds of other adult students–correspondence students are typically "goal-oriented", according to the terminology used by HOULE (1961).

Differences between participants in various courses may be great, however (GLATTER & WEDELL, 1971). In two Swedish studies (JOHANSSON & MOLANDER, 1969; WÅNGDAHL, 1979), interest in the subject as such and similar reasons for study were given particularly often, which should indicate "learning-orientation" (HOULE, 1961) rather than "goal-orientation" as the dominating motive.

2.3.3 Why did they choose to study by correspondence?

From the beginning correspondence education was, above all, a supplement to other study forms. Students most often turned to correspondence study because the courses they wanted were not arranged within their reach–or were on the whole not available by any other means.

Nowadays, this kind of reason is not dominating any longer in the industrialized parts of the world. In these countries most correspondence students have apparently *chosen* their form of study (cf. WÅNGDAHL, 1979, p. 45). This means that they prefer correspondence education because of its *practical advantages*–the possibility to study at home, at one's own rate,without having to leave one's job, etc. Another reason which is often stated is a liking for study on one's own. See GLATTER & WEDELL (1971), REKKEDAL (1976), GOORHUIS (1977) and WÅNGDAHL (1979).

2.4 The teaching material

The general didactics of the teaching material in correspondence courses is treated in handbooks on correspondence education and other surveys of the subject (e.g., HOLMBERG, 1960, 1974, 1977b; DOHMEN, 1967; ERDOS, 1967; SARRAMONA, 1975; HARRIS & WILLIAMS, 1977), in a number of how-to-do-it-books (e.g., WENTWORTH, 1968; PERRATON, 1973; JENKINS, 1976; NÖLKER & SCHOENFELDT, 1976; CUNNINGHAM, 1978), as well as in studies of research or development work character (e.g., LAUTENSCHLÄGER, 1971; BÅÅTH, 1974; 1979; LAMPIKOSKI & MANTERE, 1976; WEINGARTZ, 1979). All these works have the following features in common:

1 that, often to a very great extent, the authors draw on principles of
   (a) written communication in general, as well as of
   (b) general didactics

2 that yet, they emphasize (more or less explicitly) the special demand that the distance study situation makes on the teaching material: such material cannot be identical with a conventional textbook but must fulfil a greater number of instructional functions.

2.4.1 Some problem areas

"Independent courses" or "commentary courses"? A correspondence course can be designed either as an "independent course" – that is, with self-contained teaching material, wholly worked out by the correspondence school – or as a "commentary course", in which case the teaching material consists of one or more textbooks supplemented by a particular study guide for correspondence students. The advantages and disadvantages of both types have been studied by LJOSÅ (1975b), HOLMBERG (1977a), and WELTNER (1977).

According to WELTNER (1977), a "commentary course" is best suited to fulfil *both* of the two major functions of instructional texts: (1) to provide support *during* the learning phase, (2) to serve as a book of reference *after* the learning phase. In conventional textbooks the second function is normally more strongly stressed than the first, whereas "independent" correspondence courses tend to be oriented mainly towards the first function. In a "commentary course", the textbook(s) can fulfil the second function, and the study guide the first.

Media. The didactic possibilities of the printed word are often emphasized by the representatives of correspondence education (e.g., PETERS, 1971a; DELLING, 1975; ERDOS, 1978). Nevertheless, they seldom deny the potential value of supplementing the printed material with e.g. audio cassettes, above all in language courses (HOLMBERG, 1977b) but also in other subjects (FRITSCH, 1978). For instance, in "commentary courses", substantial sections of the study guide might probably benefit from being transferred to an audio cassette.

Way of presentation. Illustrations in instructional texts were investigated by DOERFERT & GRAFF (1977) and DUCHASTEL (1979, 1980). WALLER (1980) deals with typography in correspondence course materials. The relationship between readability levels of teaching materials and completion rates of students was studied by BRITTAIN (1972) and SILER (1974).

Without finding any significant differences, DIVESTA (1954) compared experimentally the effects of three different ways of presentation in correspondence course material. Yet, as mentioned before, HOLMBERG (1977b, 1978) hypothesizes a correlation between, on one hand, ways of presentation characterized more or less by "guided didactic conversation" and, on the other hand, students' motivation and achievement. Some support of this hypothesis is provided by a recent empirical investigation (HOLMBERG & SCHÜMER, 1980).

2.4.2 Self-check exercises

As we have seen (2.2.1), HOLMBERG (1977b, 1978) distinguishes between the real student-tutor two-way communication by mail and the *simulated* author-student *two-way communication* within the teaching material. Self-check exercises supplemented by detailed model solutions with comments would seem to be an essential component of this simulated two-way communication.

In one of my investigations (BÅÅTH, 1976b, pp. 39–42), I asked questions about practices and opinions concerning self-check exercises, among other things. The questionnaire was sent to members of the two European correspondence school

organizations EHSC and CEC (mainly providing courses at non-university levels), as well as to the British Open University. Out of 45 institutions, 34 returned the questionnaire, which means a return proportion of about 75 per cent. A majority of the answering institutions stated that they use self-check exercises in all or most of their courses. As a rule, also model answers (or the like) are given within the teaching material.

The schools (and the Open University) were also asked to indicate their attitudes to a statement, according to which self-check tests could replace assignments for submission to a substantial extent. Less than 50 per cent of the responding institutions (14) agreed, while more than 50 per cent (18) thought that assignments for submission carry functions which can hardly be taken over by self-check exercises. (See further, 2.5.4.)

2.4.3 Students' attitudes to their teaching material

In broad surveys of correspondence students' attitudes to various components of their teaching, favourable attitudes towards the teaching material are most often reported (e.g., GRAHM, 1969; GLATTER & WEDELL, 1971; HARRIS, 1972; REKKEDAL, 1978).

GRAHM (1969) drew his sample of completing students randomly from a number of courses representative of all Hermods courses (mainly low and medium level vocational courses and secondary school level courses). Out of 1,088 students, 804 answered his questionnaire (= 74 per cent). Grahm asked his sample to rank certain components of their courses with regard to instructional as well as motivational values:

- the text
- the self-check exercises
- the assignments for submission
- the tutor's corrections and comments.

Grahm found that the text and the self-check exercises were given the highest rankings as concerns instructional value. With regard to motivational value, the self-check exercises were given the second and the text the third ranking. (See further, 2.5.8, tables 6 and 7.)

2.5 The postal two-way communication

The postal two-way communication has been called "der zweite Bein des Fernunterrichts" (HENNINGSEN, 1969). Correspondence education stands on two feet: the teaching material and the postal two-way communication. The relative importance of these two principal components may vary however; cf. section 1.4.

An essential element of the contacts between a correspondence teaching institution and its students is *counselling* the students before their choice of course as well as during their studies (GRAFF ET AL., 1966; HUNT, 1973; WEISSBROT, 1977; SEWART, 1978; THORNTON & MITCHELL, 1978; FRITSCH ET AL., 1979). Although such counselling is sometimes given by telephone or, where possible, by face-to-face contacts, it is most often provided by means of postal two-way communication.

In this thesis, however, I will confine myself to the didactic two-way communication by mail, which means the postal contacts between student and correspondence tutor. As CHILDS (1971a) points out, these contacts imply a number of essential problems, partly specific to correspondence education.

2.5.1 The assignments for submission and their functions

The postal communication between student and correspondence tutor is, as a rule, induced by *assignments for submission* (cf. the explanation of terms, section 1.6). According to MACKENZIE (1974), assignments for submission hold a central position in the Open University system of distance education. They are, he maintains, ". . . the only thoroughgoing and substantial means open to the student to develop and concentrate his thinking". A study of mine reveals that representatives of European correspondence schools teaching at non-university levels also regard assignments for submission as an extremely important element in their teaching (BAATH, 1976b, pp. 20–22).

Table 2. Functions of assignments for submission, according to rankings made by European correspondence schools and the Open University (BÅÅTH, 1976b, p. 38). –For information on sample and non-answer rate, see 2.4.2.

	Functions	Rank points[1)]
1	To give the students effective feedback – help them to correct their mistakes and control their progress	91
2	To motivate the students, owing to the fact that the assignments for submission serve as sub-goals	58
3	To make it possible for the school to evaluate the students' achievements during the course, in order to be able to give each student help ("formative evaluation")	49
4	To give the instructor/tutor opportunity to motivate the students by giving them encouragement, praise etc.	38
5	To activate the students	37
6	To give the students opportunities for application and transfer of their knowledge	37
7	To make it possible for the school to evaluate the students' achievements and mark their solutions, in order to be able to give them certificates at the end of the study ("summative evaluation")	33
8	To give the school feedback – help it to find out how well its instruction works and in what ways the material should be revised	32
9	To create opportunities for contact between students and school, in order to counteract students' feelings of isolation	30
10	To give the students opportunities for survey, summing up and integrating various parts of the unit (or different parts of the course)	26
11	To focus the students' attention on important learning objectives	14
12	To serve as a means for the students to revise the whole study unit	10
13	To teach in such a fashion that knowledge is retained, through practice in writing	5
14	Sent according to schedule, to compel the students to regular work	5
Σ		465

1) Rank points were calculated in the following way: A first ranking was given 5 points, a second ranking 4 points, etc., and a fifth ranking 1 point. Thus calculated, the maximum total of points possible of any of the functions would be $34 \times 5 = 170$ points (N = 34), and the maximum total sum of points $34 \times (5+4+3+2+1) = 510$. This sum indicates that a number of institutions did not distribute as many rankings as they were allowed to do.

In the same study where this general attitude towards assignments for submission was found, I also investigated how the schools (and the Open University) looked upon the functions of such assignments and what were their experiences of them (BÅÅTH, 1976b, pp. 33–39; a short presentation of this study was given in section 2.4.2). The main results are shown in *table 2*. According to this table, assignments for submission apparently fulfil a considerable number of functions. Nevertheless, the respondents to the questionnaire tend to emphasize the following two groups of functions above all:

1 *feedback* to students/"formative" evaluation of students' learning (functions 1 and 3; as regards the latter term, see e.g. BLOOM ET AL., 1971)

2 *motivational* functions (no. 2 and 4).

Among the items that were considered comparatively important, we find an additional number of didactic functions, related to learning psychology (no. 5, 6 and 10) but also one, more closely related to social psychology: to create opportunities for *contact . . . in order to counteract . . . feelings of isolation* (no. 9). (Concerning the problem of correspondence students' supposed feelings of isolation, see section 2.6 and WÅNGDAHL, 1980.)

According to GRAHM (1969), *students* seem to value assignments for submission first and foremost from a motivational point of view (cf. sections 2.4.3 and 2.5.8).

2.5.2 Various types of assignments for submission

As a rule, the assignments for submission are designed beforehand by the correspondence school, like the teaching material, and are sent with the material. Various types of such assignments are used at different schools, in different courses, and often within the same course as well: essay tests, short answer questions, and objective test questions of varying kinds.

Practices and opinions concerning *multiple-choice questions* used as assignments for submission are reported on in my questionnaire survey previously referred to (BÅÅTH, 1976b, pp. 25–32). A majority of the responding institutions use multiple choice questions for this purpose most often in only a few courses, generally combined with other types of test questions. Most of the institutions also adopt a hesitant or slightly negative attitude towards the use of multiple choice questions as assignments for submission, *table 3*.

Table 3. Attitudes among European correspondence teaching institutions towards the statement "Used as assignments for submission, multiple choice questions are as good as other types of test questions in most subjects" (BÅÅTH, 1976b, p. 28).– For information on sample and non-answer rate, see 2.4.2.

Answer	f
Strongly agree	1
Agree	5
Uncertain	11
Disagree	15
Strongly disagree	2
Σ	34

The reasons for this view are varying, however. Two important categories of reasons were found: (1) multiple choice questions are not considered congruent with certain goals or objectives, (2) they are not regarded as good promoters of two-way communication between student and tutor.

It is nevertheless most probable that, to a great extent, the attitude in question is caused by the power of tradition, coupled with scepticism towards a phenomenon with which many of the schools are not very well acquainted (BÅÅTH, 1976b, p. 32, 82). Learning results with regard to most cognitive learning goals can indeed be tested by means of multiple choice questions (e.g., COFFMAN, 1969; BLOOM ET AL., 1971; MILLER & WILLIAMS, 1973). A dialogue between student and correspondence tutor can likewise be promoted by objective test questions–e.g., multiple choice questions–quite as well as by a test of an essay type:

> The possibility of a fruitful dialogue depends on the quality of the assignments and on the degree of inspiration and thought used by the tutor in writing his comments. The specific kind of questions is not crucial. (BÅÅTH & MANSSON, 1977, p. 11)

Cf. also AUSUBEL (1968, pp. 300–301, 583–585) and BRUNER (1960, p. 30).

Correspondence students, like the representatives of the correspondence teaching institutions, tend to react negatively to multiple choice questions if they do not have much experience of them (GRAHM, 1969). On the other hand, markedly favourable attitudes are reported by BÅÅTH (1971), BÅÅTH & MÅNSSON (1977) and SCHÜMER (1978) as concerns students who have had an opportunity to work with assignments for submission in the form of multiple choice questions.

Sometimes less restricted types of assignments for submission are used, in addition to the conventional assignments which have been prepared in advance by the correspondence teaching institution. HARRISON (1974) and LJOSÅ & SANDVOLD (1976, p. 32) discuss the possibility of utilizing *open* assignments, i.e., assignments which the students may design themselves, work out solutions to and submit to the school or university for control and comments. (Cf. BÅÅTH, 1979, p. 77.) Also *"reversed"* assignments could be used–i.e., the student may be told to ask questions to be answered by the tutor instead of the reverse, which is the traditional and, by far, most common way (HOLMBERG, 1974, p. 41; BÅÅTH, 1979, p. 77). WELANDER (1973) reports an experiment with such assignments in a vocationally oriented correspondence course.

2.5.3 Submission density

The term "submission density" (BÅÅTH, 1975) refers to the proportion between (a) the length of a correspondence course and (b) the number of submissions in a course, (i.e., occasions when solutions of assignments for submissions should be sent in to the school/university). High submission density implies short intervals between submissions and–consequently–short study units and frequent mail contacts between student and correspondence tutor. Low submission density means the opposite.

Thus, the submission density of a course may be defined as a ratio of its length to its number of submissions:

$$\text{submission density (estimated)} = \frac{\text{length of the course}}{\text{number of submissions}}$$

In order to quantify the submission density of a course we must be able to estimate the length of the course. One way is to use the number of *pages* in the course material, another to calculate the average number of *study hours* spent on the course by the students–i.e., the net study time (BÅÅTH, 1975). Of course, both measures are very crude. Page size, typography, information density per page etc. vary considerably between correspondence teaching materials. As to the average net study time, we have to rely on the students' own reports (or the calculations made by the correspondence teaching institutions). Therefore, values of submission density should be treated with great care. They are estimations which, most probably, diverge more or less from the real values.

Nevertheless, the concept is useful since it makes comparisons possible. Practices with regard to submission density appear to vary most markedly between different correspondence schools, sometimes also within the schools. In a study at the American correspondence school USAFI, TUCKER (1955) found a considerable variation between different courses round an average estimated submission density of 5 hours/study unit (= 5 hours of study on each study unit, including assignments for submission). Estimated submission density values reported from German correspondence schools varied, according to SOMMER (1965), from 2 to 70 hours/study unit. Similar answers were obtained by GRAFF ET AL. (1966) from members of the European correspondence school association CEC. In a pre-study to the experiments that will be reported in this thesis, an investigation of nine European correspondence courses rendered estimated submission density values varying from 18 to 100 pages/study unit and from 1.6 to 40.4 hours/study unit (BÅÅTH, 1975). Later, in the questionnaire study mentioned previously (2.4.2; BÅÅTH, 1976b, pp. 44–50), I obtained answers indicating a similar dispersion of estimated values of submission density. See *tables 4a and 4b*.

Tables 4a and 4b. Estimated average values of submission density at a number of European correspondence teaching institutions (BÅÅTH, 1976b, p. 45 and 48). –For information on sample and non-answer rate, see 2.4.2.

4a: pages/study unit

Pages	Institutions
9–16	9
17–32	8
33–64	8
> 64	4
No answer	5
Σ	34

4b: study hours/study unit

Hours	Institutions
2–5	4
6–10	10
11–20	5
> 20	3
No answer	2
Σ	24[1)]

In addition to this considerable variation between schools–from about 10 to around 100 pages/study unit, and from 2 to 25 hours/study unit–I found a noticeable variation within schools. Only two institutions explicitly stated that their courses are designed in such a way that the average study time/study unit required should be roughly equal.

It was also clearly demonstrated (BÅÅTH, 1976b, pp. 50–52) that study units tend to become more extensive and that, consequently, submission density tends to decrease. See *table 5*.

Table 5. Comparisons made by European correspondence schools concerning the size of their courses in the middle of the 1970's ("today") and about 20 years earlier (BÅÅTH, 1976b, p. 51).–For information on sample and non-answer rate, see 2.4.2.

The study units are, generally, today

Answer	Number of schools
considerably more extensive	12
somewhat more extensive	5
of about the same extent	11
somewhat less extensive	2
considerably less extensive	2
No answer	1
Σ	33[2)]

1) The N value in table 4b refers to institutions which stated that they had at least some idea of the average number of study hours required by their courses.

2) Since the Open University started as late as 1971, it was excluded from this question.

The following are the three main reasons given for the change by the schools that answered that their study units had become more extensive:

1 Greater demands on the students (e.g., in examinations arranged by official educational authorities or by external non-governmental bodies)
2 Didactic development of the course material; for this reason the same learning material requires more space than before
3 Economic factors; submissions–administration of solutions, postage, tutors' salaries–are expensive in a situation where correspondence schools (generally with no public subsidies whatsoever) try to be an alternative to the adult education that is offered by society (often free of charge).

The last-mentioned reason seems to be the crucial one. To be sure only five schools explicitly give this reason, but at least one of the other two reasons–greater demands on the students–is difficult to understand if it is not coupled with the economic reason. Otherwise, when extending a course, it might as well be possible to increase the number of study units, thereby keeping the length of the study units–and, consequently, the submission density–unchanged.

There is no consensus among correspondence educators as to the advisability, from an *educational* point of view, of this development towards lower submission density. Cf., e.g., the diverging opinions of HOLMBERG (1967, p. 12) and WÄHLSTRÖM (1973).

Up to now, there is only one report (FLEECE, 1956) of an experiment on variation of submission density which has been actually performed[1]. It was a rather drastic variation, though. In a number of college level correspondence courses, all of the 15 submissions in each course were left out. At the same time the number of supervised written examinations was increased from one to three. The purpose of the change was, among other things, to diminish the students' work load in order to increase the proportion of course completers, and–in addition–to make certain economic savings. The educational result was favourable: the average completion rate was increased from 50 to 63 per cent with no reduction in grades.

2.5.4 Quantity of assignments per submission

The primary reason given by FLEECE (1956)–to diminish the work load of the students–may bring to mind another two-way communication variable of potential interest: the number of assignment questions per submission. CHILDS (1971a) deals with this variable in his catalogue of unsolved problems within the didactics of correspondence teaching and, in doing so, he explicitly refers to the study by Fleece mentioned above:

> How much evidence should be required [of the student regarding his achievement]? At least one university correspondence study program experimented with the elimination of written lessons and depended entirely on test results. At the other extreme, some courses require voluminous reports in an apparent attempt to compel learning through a requirement that the student submit evidence that he has covered all aspects of the course. Is this sound, or is a sample amount of evidence of achievement sufficient? (CHILDS, 1971a, p. 117)

The attitudes towards this question vary among students as well as among correspondence educators.

On one hand, the majority (74 per cent) of the students who answered GRAHM's (1969) questionnaire (cf. 2.4.3) favoured a larger number of assignments and/or more comprehensive assignments than they had received in the courses they had just completed. STEIN (1963) and WENTWORTH (1968) are on the same line, recommending quantitatively as well as qualitatively demanding assignments.

1) ROSBERG (1966) presents a plan of a research project including the submission density problem. The experimental study was not carried out, however.

On the other hand, ERDOS (1967) and HOLMBERG (1974), among others, point out that assignments for submission should be designed in such a way that they do not demand more than the necessary amount of time and work from neither students nor tutors. Some empirical support of this standpoint is given by SLOAN (1966).

One method of reducing the quantity of assignments for submission may be to replace them with self-check exercises, at least to some extent. WELANDER (1973) reports an experiment of this kind.

As we have seen (2.4.2), representatives of European correspondence schools seem to disagree whether it is justifiable, from an educational point of view, to replace assignments for submission by self-check tests (BÅÅTH, 1976b, pp. 40–42). All respondents who answered in the negative (i.e. disagreed with the statement that self-check exercises could replace assignments for submission to a substantial extent) or were uncertain, were asked to state the reasons for their answer by indicating which function(s) of assignments for submission cannot be taken over by self-check tests. The following functions were mentioned most frequently (BÅÅTH, 1976b, pp. 41–42, and appendix 3:12):

- feedback to the students/formative evaluation of the students' learning (= functions 1 and 3, table 2, section 2.5.1)
- motivating the students (= function 4, table 2)
- providing opportunities for contact between student and school (= function 9, table 2)
- giving the school feedback on its teaching (= function 8, table 2)
- making it possible to obtain summative evaluation of the students' achievements (= function 7, table 2).

As is suggested by this list, assignments for submission carry functions which apparently require *real* two-way communication, not only simulated two-way communication within the teaching material. This applies, in the first place, to functions 7–9 (table 2), whereas functions 1, 3 and even 4 might probably be fulfilled by good self-check exercises with model or sample solutions and comments. In any case, it would still seem to be an open question whether, without detrimental effects, the number of assignments for submission could be *reduced*, by changing a certain proportion of them into self-check tests.

2.5.5 The correspondence tutors

Common to most Western writers in the field of correspondence education is the great importance they attach to the tutor and his work. The two-way communication between student and tutor is considered to be the "heart" (WEDEMEYER, 1971) or the "backbone" (HOLMBERG, 1974, p. 39) of correspondence education. Referring to the teaching at the Open University, MACKENZIE (1974, p. 45) states that the tutor's evaluation of students' papers is "*the* crucial area ... of the University's work".

However, this postal two-way communication implies certain specific difficulties. The problems are largely due to the physical distance between student and tutor and–maybe above all–to the time delay of the contacts (CHILDS, 1971a; RHYS, 1975). Under such circumstances, the educational dialogue certainly requires a considerable "competence to communicate" (GRAFF, 1978b) of the tutor.

These conditions make heavy demands on the tutors. Who are, then, the correspondence tutors? HARRIS (1975) states that, of the nearly 600 British correspondence tutors who returned his questionnaire, almost all were part-time tutors. About one third had as their main task oral class-room teaching in the same subject

as they taught in the correspondence school. Very few were housewives, retired people or students. In the GRAFF ET AL. (1966) study, however, some of the answering schools reported that they used solely permanent staff members as tutors. Apparently, correspondence tutors employed full-time were more common formerly than they are now (cf., e.g., GADDÉN, 1973).

The tutors' general and subject-related qualifications seem—on the whole—to be acceptable, according to studies made by GRAFF ET AL. (1966) and HARRIS (1975). However, SOMMER (1965) and MACKENZIE ET AL. (1968) report data which indicate that the qualifications may vary considerably, at least in certain countries.

Nevertheless, as WEDELL (1970) points out, neither subject matter qualifications nor experience from classroom teaching makes a person automatically qualified for correspondence teaching. This teaching form makes specific demands on the tutor. In spite of this, there is almost no organized training of correspondence tutors to be found anywhere (WEDELL, 1970; DRISCOLL, 1972; HARRIS, 1975). Recently, however, certain schools have started to train their own tutors by means of short correspondence courses, e.g. NKS (LJOSÅ, 1978a) and NKI (REKKEDAL, 1979). A similar, more extensive training course is being planned by the European correspondence school organization EHSC.

2.5.6 The tasks of the correspondence tutor

Since the two-way communication between student and tutor is normally induced by assignments for submission, the tasks of the correspondence tutor are closely related to the functions of these assignments (section 2.5.1).

In a correspondence course of the "M+D+" kind (section 1.4), the printed text contains and presents the entire material for learning and may, in addition, fulfil a considerable number of other teaching functions (BÅÅTH, 1974, 1979). BÅÅTH & WÄNGDAHL (1976) therefore hypothesized that the tutor's most important functions would be to get in personal contact with the student and—in doing so—to further his motivation:

> Motivation is, no doubt, of crucial importance in correspondence study, where the learner normally studies on his own, with an almost unlimited freedom with respect to time schedules etc. . . . This freedom may be ideal to the highly autonomous learner but is hardly altogether an advantage to the ordinary, more moderately autonomous student.
> Certainly, it is possible to some extent to stimulate the student's motivation by means of specific measures within the course material itself (cf. BÅÅTH, 1974). Nevertheless, this motivation furthering function appears to be extremely difficult to fulfil solely by means of the preproduced instructional material, however carefully designed this may be. Therefore, *stimulating, supporting and strengthening students' motivation* seems to be the tutor's most important function in correspondence education . . . (BÅÅTH & WÄNGDAHL, 1976, p. 16)

A review of the correspondence education literature during the last 90 years gave support to our hypothesis. In 1886 W.R. Harper, called "the father of correspondence education" in USA, wrote:

> . . . the correspondence teacher must be painstaking, patient, sympathetic, and *alive* . . . (HARPER, 1971, p. 8–9)

Statements made in the same spirit were found in writings of LIGHTY (1971, p. 19–20)—another pioneer of American correspondence education—CHILDS (1957), GRUENBAUM (1959), CAMERON (1964), and others. ERDOS (1967)—like Cameron

–also emphasizes the tutor's need of empathy and imagination in order to put himself in the place of the student. The tutor must

> . . . understand their [= the students'] difficulties, anticipate the questions they are likely to ask, and be a constant source of inspiration . . . (ERDOS, 1967, p. 39)

Our survey of opinions among prominent correspondence educators on the importance of the motivation and contact functions of the tutor was summarized in the following way:

> A good correspondence tutor
> – imagines what the students need
> – inspires the students
> – encourages them
> – likes people
> – is alive!
> (BÅÅTH & WÄNGDAHL, 1976, p. 20)

This list of desirable tutor qualities is in accordance with the attitudes of a good "facilitator of learning" which have been postulated by ROGERS (1969). It also agrees with what has been found, concerning the importance of behaviours like "warmth" and enthusiasm, in studies of efficient classroom teachers (GAGE, 1972; BROPHY & GOOD, 1974). It is probable, however, that such qualities are even more important in correspondence education than in classroom teaching, as correspondence students have to do without the potential stimulation of face-to-face contacts.

In the literature on the subject, e.g., GIBBS & DURBRIDGE (1976), some empirical evidence can be found that tutor qualities like "warmth", enthusiasm and empathy can indeed further the motivation of correspondence students. STEIN (1960, p. 166) reports an interesting case. At his institution, the percentage of completers in a correspondence course was *doubled* after the institution had changed the tutor of the course ". . . from a cold, subject-oriented man, to someone equally competent in the content who also liked people".

The furthering of students' motivation, based on an ability to establish personal contacts in spite of the physical distance and time delay, might thus be the most important function of a correspondence tutor. Nevertheless, he or she has of course several other instructional tasks as well (e.g., BÖKWALL, 1961; GRAFF, 1965; KNOWLES, 1966; LEMBCKE, 1966; GRUGEON, 1973; *Veiledning for brevskolelærere*, 1977; BÅÅTH, 1979). Cf. the functions of assignments for submission, 2.5.1.

The questionnaire to European correspondence teaching institutions (BÅÅTH, 1976b), mentioned previously (section 2.4.2), also contained a question about the work of the tutors: "Correspondence instructors/tutors generally correct (or indicate) the students' mistakes and mark their solutions. Do your instructors/tutors do something more to improve the students' achievements, strenghten their motivation etc.?" (ibid., p. 24–25 and appendix 3:3). *All* 34 responding institutions reported that their tutors allow themselves time for writing *personal comments* (of praise, encouragement, etc.)–obviously for the purpose of furthering the students' motivation. Yet, curiously enough, a few schools do not expect their tutors to write *subject-related comments* (explanations, hints etc.) to the students' answers. At these schools, the opinion might have been adopted that enclosed duplicated (or printed) model/specimen answers could completely replace subject-related comments from the tutors.

Nearly one fourth of the institutions also denied that they expect their tutors to *write answers to subject-related questions from the students.* At these schools there are apparently no good conditions for establishing the instructional dialogue between students and tutor in the "third phase" of correspondence education that has been

distinguished by LEMBCKE (1966; cf. section 1.4), exemplified by LEWIS & TOMLINSON (1977) and EIFERT (1978), and discussed by HARRISON (1974) and PRESCOTT & JARVIS (1978), among others.

In some cases, the working load of the tutors appears to be too heavy to allow any personal communication at all with the students. BIRTWHISTLE (1966) reports figures which indicate that (full-time working) tutors of one institution examine about 250 solutions a day, as an average. Although this is, most probably, an extreme (cf. e.g., HARRIS, 1975), the work of the correspondence tutor may sometimes become far too specialized and can thus assume an assembly line character.

2.5.7 Empirical studies on the effects of correspondence tutor behaviour

Very few controlled studies on the effects of correspondence tutor behaviour have been reported. SJÖGREN (1963) designed a large-scale experiment with correspondence students assigned to three groups, treated differently by the tutors:

In *group 1*, the tutors just checked the items missed and indicated where the student could find the correct answer;

In *group 2*, the tutors added corrections and encouraging comments;

In *group 3*, the tutors tried as well to establish a personal and supportive tutor-student relationship by personalized comments and exchange of personal letters.

No significant group differences were found, neither with regard to completion rate nor concerning grades. It is not clear from the report, however, if this experiment actually concerned pure correspondence education. It might as well be the case that the students took part in supervised correspondence study in classrooms. If so, this may have affected the experimental results.

In another study, most briefly reviewed by KELLY (1963), a control group was given traditional correspondence tutoring, whereas the experimental group obtained a more "personalized" instruction by mail. This meant, among other things, more extensive tutor comments. Considerable differences with respect to study perseverance were found, in favour of the experimental group.

BRADY (1976) analysed a number of descriptions of learner-tutor interactions given by correspondence students. These descriptions were related to instances of students' "learning trauma" (tending to lead to dropout from the studies). Brady reports a clear correlation between experienced "learning trauma" and description of unfavourable interactions with the tutor. He also found that correspondence tutors who regard and treat their students as individuals contribute to diminishing the risk that "learning traumas" will occur among the students.

2.5.8 What are the correspondence students' attitudes to the work of their tutors?

In BRADY's (1976) study, as well as in a study published by MACKENZIE (1976), varied student reactions are found to the work of the correspondence tutors. Mainly favourable attitudes were reported by REKKEDAL (1978, p. 107). Decidedly negative attitudes have been found in a number of other studies, however.

In the GRAHM (1969) study mentioned above (2.4.3) the work of the tutors was ranked *last* with regard not only to instructional but also to motivational values. See *tables 6* and *7*.

Both results are remarkable, particularly the one shown in table 7. There is reason to ask what factors are at work when the assignments for submission per se are considered to be the *most* stimulating and inspiring component of correspondence courses, whereas the tutors' corrections of and comments on the same assignments are ranked as the *least* stimulating and inspiring element.

Table 6. Instructional value. Answers to the question "From which part of a correspondence course do you think you learn most?" Average ranking of answers, where 1.0 means the highest average ranking possible and 4.0 the lowest average ranking possible. (GRAHM, 1969).–For information on sample and non-answer rate, see 2.4.3.

Component	Rank
Text	1.8
Self-check exercises	2.0
Assignments for submission	2.5
Tutor's corrections and comments	3.6

Table 7. Motivational value. Answers to the question "Which part of a correspondence course do you think is the most stimulating and inspiring one?" Average ranking of answers. For further explanation, see table 6. (GRAHM, 1969)–For information on sample and non-answer rate, see 2.4.3.

Component	Rank
Assignments for submission	2.0
Self-check exercises	2.4
Text	2.7
Tutor's corrections and comments	3.1

A majority of the students who returned the questionnaire of the GLATTER & WEDELL (1971) retrospective survey were inclined to blame or disapprove of the work of their tutors. Among other things, many students stated that

- they did not receive any help when they met difficulties in their studies
- the tutors were not very good at explaining faults clearly
- the tutors did not appear to take any personal interest in the students' progress

Results reported by HARRIS (1972) are on the same negative line. Similar students' attitudes have also been found by PACKNETT (1973).

2.5.9 What are the correspondence tutors' own attitudes to their work?

As we have seen (section 2.2.1), PETERS (1973) points out the risk that the division of labour in correspondence education and the resulting specialization may lead to alienation on the part of the correspondence tutor. Symptoms which might be diagnosed in this way are reported by PACKNETT (1973), HARRIS (1975) and KIRK (1976).

At an American university, PACKNETT (1973) found dissatisfaction among correspondence tutors with the low prestige of their work. These tutors also thought that their teaching ability did not improve by the correcting of and commenting on solutions of assignments for submission. Some of the British tutors participating in the HARRIS (1975) study mentioned that they felt isolated. In a similar way, KIRK (1976) decribes–from her own experience–"the loneliness of the long-distance tutor".

One possibility of meaningful job enlargement is to involve tutors in course evaluations and in improvements of course material (KNOWLES, 1966; BATES, 1974). *Another* possibility is the involvement of tutors in the designing of preproduced comments for computer-assisted correspondence tutoring (BÅÅTH & MANSSON, 1977).

2.5.10 Computer-assisted two-way communication

A rather common aid, available for the tutors in their work, is *duplicated* (sometimes printed) *model/specimen answers and/or comments* which the tutors attach to the students' solutions. In some cases, these preproduced answers/comments apparently replace the tutor's own subject-related comments completely (BÅATH, 1976b, pp. 24–25; summarized in section 2.5.6 above). Usually, however, they are utilized as a supplement to the tutor's hand-written comments.

By means of an experiment, REKKEDAL & LJOSÅ (1974) studied the effects of using preproduced comments in the latter way – as a supplement to the ordinary tutor comments. This arrangement was found to have some advantages over the exclusive use of handwritten tutor comments.

Another possibility is to preproduce comments for an automatic type-writer. A system has been reported (BÅATH, 1971, 1973) which uses multiple choice questions as assignments for submission, an optical reading machine for correcting the students' answers, and an automatic typewriter for writing out the preproduced tutor comments. Very favourable student attitudes towards the system and its elements were found.

A possible further development along the same line is to programme tutor comments for *computer-assisted two-way communication*. EHIN (1973) recommends a considerably extended utilization of computers for all routine processes at correspondence schools, including much of the tutor's (= "instructor's") work:

> An instructor's time and talents should be saved for handling unanticipated student problems and not wasted on routine, well-structured processes. (EHIN, 1973, p. 63)

Considering the heavy demands which should be made on the tutors in the two-way communication process, computer assistance could be of great help, at least to tutors working at large correspondence schools (BÅATH, 1979, pp. 114–115).

Computer-assisted two-way communication *on line* (cf. 1.6) is, so far, only a promising possibility in correspondence education (BÅATH, 1979, p. 115–116). Computer-assisted two-way communication *off line* (cf. 1.6) has been tried out, however, in large-scale tests at a number of correspondence teaching institutions. Such tests have been reported from USAFI (BRITTAIN, 1973), Télé-CNAM (CORMIER & DANIEL, 1975), Hermods, in cooperation with NKS (BÅATH & MÅNSSON, 1977) – a further development of the system mentioned above using an automatical typewriter – as well as from McGraw-Hill (LAMBERT, 1977), Markkinointi-Instituutti (LAMPIKOSKI & MANTERE, 1978) and Fernuniversität (WILMERSDOERFER, 1978). At all these institutions, computer-assisted two-way communication has been utilized in widely different subjects, e.g. at Hermods in Elementary English, EDP, Mathematics and Physics, and also in Upper Secondary School level Psychology and Electricity.

Common to all these systems but one (Télé-CNAM) is that

- the assignments for submission consist of multiple-choice questions, completely or mainly
- the students mark their answers on special forms for registration by an optical reader
- programmed comments of various kinds are printed out by a computer.

As regards problems related to the use of multiple choice questions, cf. section 2.5.2; for a more detailed discussion, see BÅATH & MÅNSSON, 1977, p. 9–11.–The systems developed by Markkinointi-Instituutti and Fernuniversität allow not only answers to ordinary multiple choice questions, however, but also certain other kinds of answers, above all "matrix responses" (EGAN, 1976; cf. BÅATH, 1979, p. 52–53) in the former system and numerical answers in the latter.

Among distinguishing features of the Hermods system (called CADE) the following two can be mentioned:

- The designer of the tutor comments can instruct the computer to build on and refer to a student's answers to questions on *previous* submissions (for an example, see *Appendix 5*; cf. section 4.3).
- When planning CADE, particular emphasis was put on the *motivational* aspects of the computer-mediated communication with the students:

> The comment letter corresponds to the tutor's corrections and comments in ordinary correspondence education. We have considered that it is extremely important to make the comments as individualized, personal and stimulating as possible. We wish to make the student feel that there is, not only an able but also a generous *person* with a positive attitude behind the comments. The computer is merely a technical intermediary bringing about that person's message. (BÅÅTH & MANSSON, 1977, p. 16)

The experiences of computer-assisted two-way communication in correspondence education are, on the whole, positive—as regards three of the systems, those of USAFI, Hermods and McGraw-Hill, very positive. As main results of an experimental study, BRITTAIN (1973) reports a higher study rate and a higher proportion of completers among students using the computer-assisted system, than among students obtaining conventional hand-written tutor comments. With regard to the CADE system, markedly favourable attitudes to the type of assignment questions, to various features of the computer-printed comment letters, as well as to the system as a whole, were found in a study of four representative Hermods courses (BÅÅTH & MANSSON, 1977). One example is shown in *table 8*.

Table 8. Distribution of answers to a question about which type of correspondence education students would prefer in other courses if they were allowed to choose—"ordinary" correspondence instruction, or computer-assisted instruction of the kind that they had obtained in the course they had just completed. (BÅÅTH & MANSSON, 1977, p. 32)

Answer	f	%
Certainly this type	122	34.8
Probably this type	145	41.3
It would make no difference	55	15.7
Probably "ordinary" correspondence instruction	17	4.8
Certainly "ordinary" correspondence instruction	5	1.4
No answer	7	2.0
Σ	351	100.0

Thus, more than three quarters of the answering students would actually prefer tutoring by means of CADE to traditional two-way communication. Only about 6 per cent stated the reverse. No difference was found between new students and students who had previous experience of conventional two-way communication.

The extremely favourable students' attitudes might be due to the following characteristics of the system:

- the type of assignment questions (multiple-choice questions; cf. 2.5.2)
- the turn-round time (comparatively short; see 2.5.11)
- the computer-mediated preproduced tutor comments (always legible, comparatively extensive, always kept in a friendly, patient tone).

Similar favourable attitudes to the CADE system were found by BOLSTAD (1974) with regard to NKS students. LAMPIKOSKI & MANTERE (1978) and SCHÜMER

(1978) report mainly positive student attitudes to the Markkinointi and the Fernuniversität systems, respectively.

It might be worth mentioning that the Open University also uses computer-corrected submission assignments of multiple choice type, called CMAs (computer-marked assignments), in addition to its TMAs (tutor-marked assignments). Yet, neither computer-generated nor any other kind of tutor comments are sent to the students as feedback to their CMA answers (GRUGEON, 1973). A development work aiming at a system like CADE has been planned, however (LJOSÅ, 1979, oral communication; cf. SEWART, 1979).

2.5.11 Turn-round time of assignments for submission

In correspondence education, the mail feedback provided by the tutor is bound to be considerably delayed. Learning experiments on delayed feedback in general (e.g., KULHAVY & ANDERSON, 1972; STURGES, 1972a, 1972b; KULHAVY, 1977) indicates that delay of feedback is not necessarily a disadvantage in cognitive learning. Nevertheless, in the correspondence study situation long turn-round time of solutions may have unfavourable effects at least on students' motivation:

> Nothing is more disheartening to the student than to put forth the effort necessary to prepare an assignment and then wait and wait and wait for its return. (CHILDS, 1963, p. 29)

This view on the importance of the turn-round time is empirically supported by HARTER (1969). In an investigation of drop-outs from correspondence courses at an American university, he found that the most frequent reason for dropping out, given by the students, was that they had to wait too long for the return of their assignments.

In the GRAFF ET AL. survey (1966) it was reported from the CEC member schools that the *internal* turn-round time, from the receipt of a student's answer until it was returned corrected from the school, varied from 2 to 14 days, with an average of 7 days. Other authors state that the *total* turn-round time (from student back to student; cf. section 1.6) is normally at least two weeks (e.g., HAAGMANN, 1970).

There are indications that students may tolerate a *total* turn-round time of about one week without negative effects, but not much more (REKKEDAL, 1973a; BÅATH & MÅNSSON, 1977). However, this limit probably varies with different student groups, courses and even countries (BÅATH, 1978). Anyhow, in correspondence education with computer-assisted two-way communication it is possible to confine the *total* turn-round time to about one week (BÅATH & MÅNSSON, 1977, p. 28).

In a well-controlled experiment with varied internal turn-round time, REKKEDAL (1973a) found a most distinct correlation between turn-round time and completion of the course. Quicker handling of the students' written assignments, giving a total turn-round time of one week or less, resulted in a higher completion rate.

2.6 Feelings of isolation in the study situation

WÅNGDAHL (1980) provides a detailed discussion of the problem of social isolation in correspondence study. It is often assumed that, since they normally study on their own – without face-to-face contacts with teachers or other students of the same course – correspondence students should experience feelings of social isolation, or at least run the risk of experiencing such a feeling. One example:

> Studying by oneself over an extended period of time can be a pretty lonely business. This is not particularly a matter of physical isolation. It grows out of

> the lack of opportunity to work with others on matters of common interest. Since the correspondence study student often cannot establish this kind of relationship locally, it becomes a concern of the correspondence study center to find ways of establishing warm ties with the student to reduce the feeling of isolation which he may well develop. (CHILDS, 1971a, p. 113)

In this context it would be reasonable to distinguish between *adult* correspondence students and (the considerably smaller group of) teenagers studying by correspondence. We must also distinguish between a general feeling of social isolation and a feeling of social isolation *in the study situation*. It is hardly probable that adult correspondence students, who are typically employed full-time and married, would experience a general feeling of social isolation due to their study form. They may feel isolated *in their studies*, however, especially if their work has no direct connection with the subject(s) they are studying.

FLINCK (1978) asked the participants in his experiments if they had felt isolated during their correspondence studies. See *table 9*.

Table 9. Experienced feelings of social isolation in the study situation (FLINCK, 1978, p. 132; cf. pp. 72, 90, and 99)

Answer	f	%
Yes, to a great extent	12	5
Yes, to some extent	83	33
Uncertain	28	11
Hardly	59	23
No, not at all	68	27
No answer	2	1
Σ	252	100

As shown in table 9, 38 per cent stated that they had felt socially isolated in their studies—yet only 5 per cent "to a great extent". This can be compared with the 50 per cent who more or less denied the feeling of social isolation—27 per cent of whom emphatically: "not at all".

Similar results are reported by AHLM (1972a) and WÄNGDAHL (1979).

Thus, the hypothesis of correspondence students' feeling socially isolated in their study situation has been supported to a certain extent by empirical investigations. It should be noted, however, that a substantial proportion of the students have apparently *not* experienced any feelings of isolation.

2.7 Simultaneous two-way communication as a supplement to correspondence education

Correspondence education can be combined with other teaching forms which make it possible to supply simultaneous two-way communication. One distance teaching form, namely *telephone teaching*, is of particular interest. So are various forms of *face-to-face contacts*.

2.7.1 Telephone teaching

Although various kinds of telephone teaching are practised comparatively often in other contexts, particularly in the USA, telephone tutoring is apparently a rather unusual supplement to correspondence education—at least in Europe (BÅATH, 1976b). Only 3 institutions out of 34 report experience of systematic telephone tutoring.

In Sweden, telephone tutoring has been utilized as a support to correspondence study at the Swedish State School for Adults in Härnösand since the late sixties (FOLKE & JOHANSSON, 1970). FRANSSON & THÅNG (1978) report experiences of self-study supported by telephone tutoring at the same school. In the new distance teaching programmes of Swedish universities and other institutes of advanced studies, the telephone is a common aid, much appreciated by the students (FLINCK, 1976b; WILLÉN, 1978).

In a study of a representative sample of Hermods students, AHLM & BÅÅTH (1971) found a considerable interest in telephone tutoring as a supplement to correspondence study, especially in Mathematics. In a later experiment (AHLM, 1972b), students of Mathematics were allowed to call up their tutor in her home. Very few (only 12 per cent) utilized this offer, however. Nevertheless, the attitudes to telephone tutoring were favourable, whether the students had phoned or not.

As a contrast to most previous experiments, FLINCK (1978) arranged systematic telephone tutoring *on the tutor's initiative*. The students involved studied French and Economics. In the language course the experimental group, having obtained telephone tutoring, achieved better on a final test than the control group. In both courses, students of the experimental group stated to a greater extent than students of the control group that their interest in the subject as well as their knowledge had increased. No differences were found as to experienced feelings of isolation in the study situation.

AHLM (1972b) and BÅÅTH (1979, pp. 116–117) include tentative analyses of which didactic functions telephone tutoring can fulfil as a supplement to correspondence education.

2.7.2 Face-to-face contacts

Correspondence education is often combined with face-to-face contacts, above all in countries of the Eastern bloc (cf. section 1.4), but also in many systems for distance education in other parts of the world, particularly in Australia (PETERS, 1971b; GOODMAN, 1972; FLINCK, 1976a; DAHLLÖF, 1977; WILLÉN, 1978).

Combinations of correspondence education with face-to-face contacts are more infrequent in European and American correspondence education at non-university levels, but they do occur (GRAFF ET AL, 1966; MACKENZIE ET AL, 1968; BÅÅTH, 1976b). The types of face-to-face contacts vary, e.g., a weekend seminar at the beginning of a course, various kinds of classes, seminars, study circle meetings or "consultations" during the course, and/or a short or more extensive face-to-face period at the end of the course, aimed at preparing the students for their examination.

The supplementary face-to-face contacts may be compulsory or optional. When optional, they are in many cases utilized only to a very modest extent (BÅÅTH, 1976b). If, on the other hand, the face-to-face contacts are made compulsory in the sense that the correspondence course cannot be studied without participation in the face-to-face sessions, one runs the risk of deterring a considerable number of potential students from joining the course. One solution—much practised in Norway but to some extent also in Sweden—is to offer courses *both* as pure correspondence courses *and* as combined courses (correspondence teaching + face-to-face contacts).

FRANSSON & THÅNG (1979) report experiences of a great number of Swedish projects trying to combine self-study or correspondence study with face-to-face tutorials. WÄNGDAHL (1977) provides an extensive survey of research and discussions on the topic. In particular, she deals with the debate on this question in West Germany, where opinions vary from dogmatic adherence to pure—"autonomous"—correspondence education to equally dogmatic devaluation of the educational potential of this study form.

In a recent report, WANGDAHL (1980) discusses the situation of the correspondence student and his/her need of face-to-face communication. Referring to KOLB (1976), among others, she points to the value of face-to-face contacts in order that the student gets a broader frame of reference than can be provided by his/her interactions with teaching material and tutor in pure correspondence education. However, like DANIEL & MARQUIS (1979), she emphasizes the importance of providing the right mixture of simultaneous contacts and correspondence study phases. As a rule, face-to-face sessions should only be used as a support of the correspondence course.

The need of face-to-face contacts will most probably vary with subject areas or teaching goals, with target groups, as well as with different didactic qualities of the teaching material (KUSTERMANN, 1970; HOLMBERG, 1976a, among others). Correspondence education based on different teaching models (BÅÅTH, 1979) will also make face-to-face contacts desirable to considerably varying degrees (cf. section 2.2.4).

According to POWELL (w.y.), BERG (1968), KUSTERMANN (1970), REKKEDAL (1978) and WANGDAHL (1979), many participants in pure correspondence education think that face-to-face contacts would give them valuable support in their studies. It should be noted, however, that there are also a substantial number of students who prefer to remain pure correspondence students and decline the offer to participate in supplementing seminars, study circles etc. (KUSTERMANN, 1970; BEIJER, 1972; MÜLLER, 1974; cf. BÅÅTH, 1976b, on the often infrequent attendance at voluntary face-to-face sessions).

On the whole, a greater study rate and a higher proportion of course completions are the most tangible effects of face-to-face contacts as a supplement to correspondence education, according to studies published (MONTROSS, 1956; LOCKWOOD, 1973; BOLTE ET AL., 1974; MÜLLER, 1974; NESS, 1976; SMITH, 1976).

2.8 Study results

2.8.1 Study perseverance

Completion is one of the outcome variables in correspondence education which is most often reported. It is far from self-evident, however, what is meant by non-completion, or dropout, in this context. At most correspondence schools students are being enrolled continuously, and they are often allowed to keep a very flexible study time schedule. This makes it difficult to determine exactly when a slow student should be considered as a dropout. In certain investigations, inactivity during 3 months has been used as a criterion of non-completion, in other cases, inactivity during 6 months (inactivity = no assignments sent in).

It should be added that non-completion from the school's point of view is not necessarily identical with non-attainment of the student's own study goals. Completion is not ". . . directly indicative of the learner's achievement or, of the accomplishment of his goals" (WEDEMEYER, 1971, vol. 4, p. 556; cf. LIGHTY, 1971, p. 21; DELLING, 1975). To some students, course completion is hardly an essential study goal. They want to get something specific from their course and are content when they have obtained that. A dropout who was a successful inventor was asked in an interview why he had not completed his course. His answer was:

> I am a busy man. I took this course to learn how to solve a certain problem in advanced physics. When I learned that, I stopped sending in lessons. (JAMES & WEDEMEYER, 1959, p. 93)

Whatever the reasons of non-completion, the dropout rate in correspondence education is often most considerable (e.g., NOFFSINGER, 1926; SOMMER, 1965; DONE-

HOWER, 1968; MACKENZIE ET AL., 1968; BRITTAIN, 1970; PFEIFFER & SABERS, 1970; REKKEDAL, 1972a, 1978; BARTELS & FRITSCH, 1976). When non-starters are included among non-completers (cf. 1.6), dropout rates round 50 per cent are not unusual. The variation between schools and even between courses at the same school is however most considerable. As an extreme, from 0 to 100 per cent dropouts have been found in different courses of the same institution (WARD, 1954).

Non-starters are sometimes as frequent as—or even more frequent than—"real" dropouts. On the whole, most of the dropping out normally happens during the very first part of a correspondence course (JAMES & WEDEMEYER, 1959; SHEATH, 1965; SOMMER, 1965; PFEIFFER & SABERS, 1970; REKKEDAL, 1972a, 1978).

Apparently, however, the completion rates in correspondence education do not differ very much from what is usual in other forms of non-compulsory, part-time adult study (cf., e.g., VERNER & DAVIS, 1964; BORGSTRÖM ET AL., 1970; NILSEN, 1974; BORGSTRÖM & JONSSON, 1976; HOUTKOOP, 1979).

Why do some students drop out? Certain *course variables* seem to be clearly related to completion. As a rule, short, vocationally oriented courses have comparatively good completion rates. This is especially the case when the course aims at a higher qualification within a vocational area where the students are already working (ALLEN, 1971; SMITH, 1976; HOUTKOOP, 1979).

In a number of studies, correlations have been found between *demographical variables* and completion. When studying the same courses, women discontinue their studies to a smaller extent than men according to studies by DONEHOWER (1968), REEDY (1971), and LOCKWOOD (1973). Age constitutes another example. DONEHOWER (1968), BRITTAIN (1972) and REKKEDAL (1972a) found that older students completed their courses to a higher degree than younger ones.

In addition, the *reasons for taking the course* have been shown to make a difference (DONEHOWER, 1968; BRITTAIN, 1972), as well as factors like *"maturity"* or being in an established family and work situation (BRITTAIN, 1972; REKKEDAL, 1978). *Previous positive experience of correspondence education* is also most clearly correlated with course completion (REKKEDAL, 1978; WÅNGDAHL, 1979).

The *causes of and reasons for* non-completion given by the students are most often factors which are not directly related to the teaching provided: (1) lack of time, generally due to the student's gainful employment, (2) changed plans, (3) ill-health, family problems, etc. (FAIRING & HUGHES, 1950; BRADT, 1956; JAMES & WEDEMEYER, 1959; SLOAN, 1966; SHEATH, 1965; REKKEDAL, 1972a, 1978; HOUTKOOP, 1979). Some respondents do state teaching-related factors as a major cause or reason, however, e.g., difficult and uninspiring course material (KUSTERMANN, 1970), too long turn-round time of assignments and a harsh tutor (HARTER, 1969), or difficulties in studying on one's own (WÅNGDAHL, 1979).

A number of researchers report favourable effects on students' study activities and course continuation of measures taken by the correspondence school, such as *reminders, encouraging letters etc.* (PFEIFFER, 1969; BRITTAIN, 1972; REKKEDAL, 1972b; REKKEDAL & HALLEM, 1975).

MALLEY ET AL. (1976) have studied the dropout problem from an interesting theoretical point of view: Durkheim's well-known theory of suicide, previously applied by TINTO (1975) to dropout in higher (face-to-face) education. Malley et al. hypothesize that, as a rule, correspondence students are weakly integrated into the social system of the teaching institution. Their interactions with representatives of the correspondence school are often rather infrequent and not very intense, and they have normally no contacts at all with other students at the school. This tends to entail low involvement in the social system, which in turn is an indicator of potential dropout. Consequently, according to this model all participants in pure correspondence education are "would-be-suicides"—i.e. potential dropouts. Malley et al. suggest

that the way out of this situation may be found in supplementary face-to-face contacts with the correspondence tutor and/or with fellow students.

As we have already seen (2.7), *supplementary face-to-face contacts* can actually further correspondence students' study rate and increase the proportion of completers.

2.8.2 Students' achievements

To a considerable extent – as mentioned in section 1.5 – the history of correspondence education can be seen as a struggle for recognition. One course of action among correspondence educators has been to report the achievements of correspondence students, preferably compared to results gained by students studying by other means. Up to the fifties this was the by far dominating strategy of research on correspondence education.

In at least some 30 reports correspondence students' achievements are compared with grades given to participants in conventional classroom study or to students who were given programmed teaching, classroom teaching combined with TV-teaching, etc. (Examples: ZIEGEL, 1924; CRUMP, 1928; FEIG, 1932; LARSON, 1936; CHILDS, 1949; DYSINGER & BRIDGEMAN, 1957; PARSONS, 1957; SJOGREN, 1964; SHEATH, 1965, 1973; GREEN, 1967; AHLM, 1970.) The majority of these studies were briefly surveyed by MATHIESEN (1971) and CHILDS (1971b).

All these investigations concern students at college or high school level, correspondence education in the latter case being quite often a kind of supervised correspondence study in classrooms. The majority of the studies are descriptive, but a few have an experimental design. The typical result reported in both types of studies is that no differences were found. In those cases where differences were established, they consistently favour the correspondence students.

In recent years the value of comparative studies of this kind has been questioned and discussed (MACKENZIE ET AL., 1968; CHILDS, 1971b). On the whole, the typical "no difference" result of studies within this area may be regarded as a special case of the "teaching-learning paradox" (DUBIN & TAVEGGIA, 1968): No teaching form is measurably to be preferred over another when exclusively evaluated by final test results or examination performances. – Cf. also PETERS' (1973, p. 17) criticism, from a theoretical point of view, as regards many of the comparative studies on correspondence education (section 2.2).

Investigations of a different, less usual but probably more valuable kind, study the long-term effects of correspondence teaching. WOOLSEY (1974) tried to evaluate correspondence education by investigating "the state of job readiness achieved by correspondence graduates". A similar work-related follow-up study was undertaken by NEUMANN & MÜLLER (1976). In both cases, results favourable to the teaching form were reported.

2.8.3 Study time

Most probably, study time is an essential educational variable (CARROLL, 1967; NILSEN, 1974).

As concerns correspondence education, it would seem recommendable to distinguish between two different study time variables: Gross study time and net study time. The term *gross study time* denotes the whole time from the student's application to the course until he has sent in his solutions of the last assignments for submission. Gross study time may be calculated in weeks. *Net study time* refers to the actual time that the student has spent on his course and may, preferably, be calculated in hours.

Gross study time. Hardly any other educational form providing two-way communication between student and teacher allows the students as much freedom with regard

to time as correspondence study. At most correspondence schools, students are almost completely free to study at their own rate (BÅATH, 1976b, pp. 54–57).

This flexibility, as far as time is concerned, is no doubt one of the most attractive features of correspondence education (cf. section 2.3.3). It fits also well into an independent learning philosophy (section 2.2.3).

It can nevertheless be questioned whether this freedom does not also imply considerable disadvantages, at least to students who are not very autonomous and not very highly motivated:

> . . . a considerable number of the students that do not continue probably drop out without having attained their goals, in some cases presumably due to the lack of pace-making devices in typical correspondence education – the reverse of the almost unlimited freedom of study time. (BÅATH, 1976b, p. 84).

REKKEDAL (1978, p. 118) is on the same line. Some students answering his questionnaire mention the free study rate both as the greatest advantage *and* as the greatest disadvantage of correspondence education. Rekkedal adds that, to a large extent, this is probably a correct observation.

Net study time. Net study time in correspondence study has not been very much investigated. When reported at all, it has most often been estimated in study hours per week (e.g., REKKEDAL, 1978). However, in the pre-study (BÅATH, 1975) to the experiments reported in this thesis, I tried to obtain information on correspondence students' total net study time. Surprisingly great variations were found. For instance, in an elementary Physics course the number of study hours reported by the students varied from 4 to 300 (Mdn = 40). In a basic course in English the corresponding figures were 16 and 700 (Mdn = 150).

Results like these may of course be interpreted as an indication that, to a maximum extent, students take advantage of the freedom with regard to time that is offered in correspondence education. It must be questioned, however, if the students reporting the extreme values really belong to the target groups of the courses in question.

3 Problem area and aim of the study

3.1 Introduction

Although correspondence education is, on the whole, a comparatively unexplored field, a few sub-areas appear to be more thoroughly investigated than others. For instance, we know a great deal about who the correspondence students generally are, why they study as adults, why they choose correspondence education, to what extent they complete their courses, and how they achieve on final tests and in official examinations. The same does not apply to other sub-areas within the field, however, for example the didactics of correspondence education.

As would be evident from the survey in the previous chapter, some research has been devoted to didactic problems in correspondence education during the last two decades. Nevertheless, it is still possible to agree to a statement made by CHILDS (1971a), in a paper from 1962, on our lack of scientifically based, "... adequate knowledge about how to teach by correspondence":

> I realize, of course, that we must know a great deal about it because we do teach this way with remarkable effectiveness ... But when it comes right down to it, what do we really know about the teaching methods we employ in correspondence study?
>
> ---
>
> ... we badly need research on the methodology of teaching by correspondence. (CHILDS, 1971a, p. 116, 118)

3.2 Two-way communication in correspondence education as a problem area

Normally, instruction by correspondence is provided by means of (a) a particular teaching material, (b) postal two-way communication between student and tutor. (Cf., e.g., sections 1.4 and 2.5.)

As concerns the *teaching by means of the course material* there are, no doubt, a great many questions which demand being answered. Still, the practical need of research in this sub-area seems not to be as acute as in the other one. According to investigations reported, students do not raise strong objections specifically to the teaching material (section 2.4.3). As far as non-public correspondence schools at non-university levels are concerned, this might be due to the fact that such institutions generally pay at least as great attention to the didactic design of the course material as to the two-way communication element of their teaching (cf. section 1.4).

Moreover, several of the didactic problems in this sub-area are hardly specific to correspondence education. It might therefore be possible, to a substantial extent, to draw on experience of and research on other self-instructional teaching aids, in certain respects even on experience of and research on teaching aids on the whole.

With regard to *the two-way communication at a distance between student and tutor*, the situation is somewhat different. There are many indications that this is a critical element of correspondence education. In several cases, both students and tutors report negative experiences of the two-way communication. As we have seen, GRAHM (1969), GLATTER & WEDELL (1971), HARRIS (1972), and PACKNETT (1973) found evident signs of *students'* dissatisfaction with the work of their tutors (section 2.5.8). In the three studies first mentioned, in which the students' opinions of their teaching material were also investigated, no corresponding infavourable attitudes towards this element of the distance teaching were found.—As concerns the *tutors*, their working situation may often be problematic (BIRTHWHISTLE, 1966; PETERS, 1973; HARRIS, 1975; KIRK, 1976; cf. section 2.5.9). Sometimes this is clearly reflected by the tutors' attitudes to their work (PACKNETT, 1973).

Moreover, it might not be as easy to draw on experience and research from related fields in this case as in the case of the teaching material. Two-way communication in correspondence education—and in distance education on the whole—appears to be a comparatively distinct educational research area, an area which was, in addition, most sparsely explored up to the middle of the seventies.

3.3 The research project "Two-way communication in correspondence education"

In 1972, the Research and Development Committee of the correspondence school organization EHSC (European Home Study Council) sent out a short questionnaire to its members. The questionnaire asked about the need of research on correspondence education experienced by the members, particularly within the didactic areas. The answers indicated that, according to a clear majority of those schools which returned the questionnaire, it was essential to study aspects of the two-way communication between student and tutor in greater detail.

On the basis of the questionnaire answers, detailed discussions with members of the EHSC R & D Committee, and considerations like those presented in the previous chapter, the future project leader Rune Flinck and I worked out a preliminary plan for the research project "Two-way communication in correspondence education" (BÅÅTH & FLINCK, 1973). The overall purpose of the project ought to be practical. We were asked to study a number of possible ways to improve and/or to simplify the two-way communication between student and tutor in correspondence education. It was suggested that an experimental approach could be used as research method; if so, EHSC member schools would try to provide student groups suitable for the experiments.

The original problem analysis made in cooperation with members of the EHSC R & D Committee indicated that it would be convenient to study

- a number of assumedly important variables of *pure correspondence education*, as well as
- possible combinations of correspondence education and *oral two-way communication* between student and tutor.

When choosing between conceivable forms of oral two-way communication, possible to combine with correspondence education, we decided to study

- an *electronic medium* which could be used in distance education, as well as
- some kinds of *face-to-face contacts*.

The electronic medium should make *simultaneous* oral *two-way* communication possible, a requirement which excludes not only radio and TV but also audio

cassettes. Therefore, *the telephone* was chosen, a medium which appears to be a potentially most powerful supplement to communication by mail.

In short, the following possible ways to improve and/or to simplify two-way communication in correspondence education became the main tasks of the research project, each defining one experimentally designed sub-project:

Sub-project 1: A number of variations of the traditional *mail communication*
Sub-project 2: Combining the mail communication with systematic *telephone tutoring*
Sub-project 3: Combining the mail communication with various kinds of *face-to-face contacts*.

The experiments were carried out in Sweden, Norway, and Great Britain. (Originally, participation of schools in Holland and West-Germany was also planned and agreed to but had to be cancelled for various reasons.) The reasons why the experiments were located to different schools and countries were as follows:

- The project work was planned and carried through in cooperation with the European correspondence school organization EHSC
- It would have been impossible to burden a single correspondence school or schools from one and the same country with all the experiments
- By distributing the experiments on various countries we hoped to get a broader empirical base from which to draw our conclusions.

A number of separate studies have been published in relation to the experiments:

- related to *sub-project 1*: BÅÅTH (1975, 1976b)
- related to *sub-project 2*: FLINCK (1975a, 1976b)
- related to *sub-project 3*: WÄNGDAHL (1977)
- *overlapping*: BÅÅTH (1979), BÅÅTH & WÄNGDAHL (1976), FLINCK (1975b, 1977), WÄNGDAHL (1980).

Sub-project 2 (dealing with systematic telephone tutoring as a supplement to correspondence education) is concluded (FLINCK, 1978).

3.4 Problems of sub-project 1

This thesis deals with sub-project 1. Consequently, it is concerned with problems related to the postal two-way communication in (pure) correspondence education.

As mentioned in the preceding section, two studies directly related to sub-project 1 have already been published. In the first one (BÅÅTH, 1975), I discussed the concept of submission density and made an empirical try-out of different methods to estimate the submission density of nine courses which were planned to be used for the experiments of the sub-project. In the other study (BÅÅTH, 1976b), I reported practices and opinions at a number of European correspondence schools (cf. section 2.4.2) with regard to, above all, assignments for submission, submission density and related topics.

As previously indicated, the whole research project has a practical aim and direction. Sub-project 1 is no exception: its experiment series is focused on problems of immediate practical significance to correspondence schools:

Main problem 1: The submission density of assignments in correspondence courses
Main problem 2: The possibility partly to replace assignments for submission by self-check exercises
Main problem 3: The possibility of replacing the routine parts of the traditional postal two-way communication between student and tutor by computer-assisted two-way communication.

3.4.1 The submission density of assignments

Simplified, the first main problem can be worded like this: Does it make any difference if we increase or decrease the number of assignment submissions in a correspondence course? In other words: Is the submission density of any importance with regard to correspondence students' study perseverance, attitudes to their studies, achievements, or time needed for their studies?

The importance of assignments for submission is often emphasized by representatives of correspondence education (above, 2.5.1). The same applies to the two-way communication between student and tutor (2.5.6). It would therefore be easy to assume that the assignment submissions are normally and consistently arranged in such a way as to make the mail contacts very frequent. As we have seen (2.5.3), however, the submission density varies considerably between different schools, sometimes also between different courses at the same school. In addition, there is a clear trend that the submission density is getting lower (table 5, section 2.5.3).

The main reason for the ongoing change of submission density is, most probably, of an economic kind. Among other things, the costs of postage, administration of the two-way communication, and the tutors' salaries, have increased considerably during recent years. A maintenance of the customary submission density would therefore entail a severe rise in course fees. This, in turn, would seriously affect the possibility of correspondence schools to be a real alternative to adult face-to-face education, which is nowadays in many countries offered largely free of charge or substantially subsidized by society (whereas, as a rule, correspondence schools obtain no support from society at all; cf. section 1.5). In this situation, many correspondence schools have obviously preferred lowering the submission density to raising the course fees dramatically (2.5.3).

It is necessary, however, to study the *educational effects* of a reduction in submission density. As we have seen, there is no consensus among representatives of correspondence schools with regard to this question (e.g., HOLMBERG, 1967; WAHLSTRÖM, 1973). Nor have any controlled studies of the matter been undertaken up to now, except FLEECE (1956).

As was shown by GRAHM (1969), assignments for submission seem to have an undeniable motivational function (table 7, section 2.5.8; cf. 2.5.1). It is quite conceivable that frequent assignment submissions should strengthen this motivational effect, while it might be weakened by infrequent submissions. Most likely, also other functions of assignments for submission and of the two-way communication between student and tutor could be furthered by a high submission density, functions like feedback and counteracting possible feelings of isolation in the study situation—cf. 2.5.1 and 2.6.

The assignment submissions obviously imply a contact with the correspondence school and an opportunity to establish a dialogue with the correspondence tutor. As we have seen (2.8.1), MALLEY ET AL. (1976) assume that, as a rule, correspondence students are comparatively weakly integrated into the social system of their school; consequently, they are potential dropouts. More frequent interactions due to higher submission density might therefore result in a firmer integration and a re-reduced proportion of dropouts.

On the other hand, it is quite possible that at least highly autonomous students (cf. 2.2.3) not only prefer a low submission density but also actually gain better study results if the compulsory contacts with the correspondence school/correspondence tutor are not too frequent.

In addition, many correspondence students probably regard the assignments for submission as tests. To such persons, frequent submissions might strengthen their test anxiety, if any, to a level above the optimum—with a lower completion rate, more negative attitudes, deteriorated achievements, and/or prolonged study time as a result.

3.4.2 Assignments for submission partly replaced by self-check exercises

The second main problem of sub-project 1 can be worded like this: Does it make any difference if we reduce the number of assignment questions intended for submission to a considerable extent, in such a way as to replace assignment questions by self-check exercises? Can we find any effects of such a change, in terms of study perseverance, attitudes to the study, achievements, or study time?

In section 2.5.4, different opinions were reported as to the proper amount of assignment questions per submission. Some correspondence teaching institutions try to give their students assignment questions for submission on all reasonably important objectives of a study unit. Others make a choice among the objectives and give their students comparatively few assignment questions. The students' own opinions on this topic are also varying (cf. GRAHM, 1969 and SLOAN, 1966).

Given that the submission density is kept constant, the number of assignment questions on each submission is of immediate practical significance to the correspondence schools. The size of the tutor's work obviously varies with the quantity of assignment questions per submission. Consequently, any change with regard to this variable will affect costs.

One method to prevent possible unfavourable educational effects of a reduction in the quantity of assignments per submission might be to replace the omitted assignment questions by self-check exercises and model (or sample) solutions with preproduced comments–all within the teaching material. It might even be possible to gain certain favourable effects by an arrangement of this kind, which implies that part of the *real* two-way communication by mail is replaced by *simulated* two-way communication within the teaching material (cf. 2.2.1, Holmberg's theory of "guided didactic conversation").

However, as we have seen (2.4.2, 2.5.4), many representatives of correspondence teaching apparently adopt a negative or hesitant attitude to the replacement of a substantial number of assignment questions by self-check exercises. It is nevertheless probable that, to a considerable extent, self-check tests could fulfil functions like feedback (and similar) and even, to a certain extent, motivation.

On the other hand, it is obvious that the contact function could hardly be well provided for by means of simulated two-way communication. Since only a *reduction* in the number of assignment questions is concerned here–not a total elimination of the submission assignments–the contact function may still be fulfilled, irrespective of the quantity of assignment questions intended for each submission.

3.4.3 Computer-assisted two-way communication

The third main problem can be worded this way: Could a system for computer-assisted two-way communication in correspondence education provide as good effects as traditional two-way communication with regard to study perseverance, attitudes to the studies, achievements, and time needed for the studies?

PETERS (1971c, 1973) has described correspondence education as an industrialized process, characterized by, inter alia, rationalization, careful planning, considerable division of labour, mechanization of certain functions, and assembly line principle for certain functions (section 2.2.1). As far as this description is adequate, it might appear logical to proceed one step further and automatize those tutor functions which are repetitive and, consequently, can be handed over to a computer (cf. EHIN, 1973; above, 2.5.10). A computerization of all repetitive tutor functions would probably eliminate the risk of alienation on the part of the tutors which PETERS (1973) has called attention to. When the computer takes over the routine tasks of teaching, the creative and more social instructional tasks are left to the tutors: to design computer comments, and to enter into personal communication in answer to questions or comments from the students.

Computer-assisted tuition might also be *one* way to soften the negative attitudes to postal two-way communication that have been found in several studies (section 2.5.8). As we have seen (2.5.10), very favourable experiences of certain systems for computer-assisted tuition have been reported (BRITTAIN, 1973; BAATH & MANSSON, 1977; LAMBERT, 1977).

There is, however, a rather wide-spread scepticism among representatives of correspondence schools with regard to the educational effects of multiple-choice questions (section 2.5.2). For similar reasons, the usefulness of computerized tutor comments might be doubted. One way to shed additional light upon these issues would be to compare the educational effects of different versions (traditional–computer-assisted) of the same course or courses.

3.5 Hypotheses to be tested

On the basis of the preceding problems analysis, the following three groups of hypotheses have been stated:

1 Various degrees of *submission density* lead to differences with regard to

- study perseverance (start, completion)
- attitudes to the study (6 different aspects)
- achievements (as measured by a final test)
- study time (gross and net study time);

(in all, 11 hypotheses).

2 Various quantities of *assignment questions on each submission* (omitted assignment questions being replaced by self-check exercises with model answers and preproduced comments) lead to differences with regard to

- study perseverance (start, completion)
- attitudes to the studies (7 different aspects)
- achievements (as measured by a final test)
- study time (gross and net study time);

(in all, 12 hypotheses).

3 Various *types of two-way communication* in correspondence education (computer-assisted–traditional) lead to differences with regard to

- study perseverance (start, completion)
- attitudes to the studies (6 different aspects)
- achievements (as measured by a final test)
- study time (gross and net study time);

(in all, 11 hypotheses).

Part II: Investigation

4 Design and procedure

4.1 Introduction

As was stated in chapter 3, the purpose of the present study is to shed light upon problems related to

1 the submission density of assignments in correspondence courses
2 the possibility of replacing a substantial part of the assignments for submission by self-check exercises
3 the possibility of replacing the routine parts of the traditional postal two-way communication between student and correspondence tutor by computer-assisted two-way communication.

Since the problems appear to be well fitted for quantitative comparisons between different groups, an experimental approach was chosen.

When compared with other research types, field experiments have advantages (e.g., KERLINGER, 1964) as well as disadvantages (e.g., HAMILTON, 1976). In at least one respect, correspondence education appears to be better suited to experimental studies in realistic teaching-learning situations than most other forms of education. Each learner studies on his own; consequently, students can be distributed into experimental groups and experimental data can be treated statistically without consideration of their belonging to classes or other teaching groups.

In this chapter, I will first present the courses which were used in the experiments (4.2). In connection with this is given a short description of the system for computer-assisted two-way communication –CADE– which was utilized in some of the courses (4.3). The sampling and the randomization of the students are described in section 4.4. In section 4.5, the reader will find the three experimental designs (one for each problem area). The instruments for data collection will then be presented (4.6) and, by the end of this chapter, I will describe the participants–the students taking part in the experiments (4.7). The loss of data will be analysed in the following chapter (5).

4.2 Courses

4.2.1 The choice of courses

As has already been observed, this study was carried out in cooperation with the European correspondence school organization EHSC. After the problem areas had been defined by the project group together with representatives of the EHSC, all the member schools were asked if they were interested in participating with courses and students. During the subsequent discussions with those schools that declared their

willingness to take part, the following *guiding principles with regard to the choice of courses* were stated by the project group:

1 The courses should represent *different subject areas* (languages, social/behavioural sciences, mathematics/natural sciences), in order that the experiments could provide results to some extent generalizable to various subject areas.
2 They should be intended for *adults, studying at elementary or secondary school level*; if vocationally oriented, the courses should be at a corresponding level. Thus, the experiments could be focused on courses and student groups which are typical of most correspondence schools.
3 They should have *a comparatively large number of applicants per year* (at least around 200). Like the remaining two principles, this principle was dictated by our endeavour to perform the experiments within a reasonably limited time; considering the often high proportion of non-completers, about 200 students per experiment were regarded as a desirable minimum in order that statistical comparisons between experimental groups should be possible.
4 They should be *of moderate extent* (an average student should be able to complete a course in no more than one year, while being gainfully employed).
5 As far as possible, the students should *not study any other correspondence course simultaneously*. Therefore, the courses should preferably not be part of an extensive course programme.

Naturally, these five guidelines considerably limited the number of courses possible to use in the experiments. In addition, some schools withdrew for different reasons, although they had originally declared their readiness to take part in the experiments of sub-project 1. For instance, representatives of a Swedish school declined participation because they did not believe that multiple choice questions were appropriate for such correspondence teaching as is offered by their school. A Dutch school, using multiple choice questions in most of its courses, withdrew for a different reason. The courses of this school have an extremely high estimated submission density (cf. BAATH, 1975, p. 21). In spite of this, its representatives questioned whether it could be ethically defensible to arrange an experiment in such a way as to give certain experimental groups more extensive study units than others – that is, more infrequent student-tutor contacts. Evidently, submission density was regarded as an essential variable at this school.

4.2.2 A survey of courses used in the experiments

After thorough discussions with EHSC member schools, a number of courses, possible to use in the experiments of sub-project 1, crystallized. *Table 10* shows these courses in relation to the three problem areas, as well as to the three subject areas. Later on, in section 4.2.3, those courses which were actually used will be fully presented.

The courses planned for experiments within problem area 3 – computer-assisted versus traditional two-way communication – are identical with the three Swedish (Hermods) courses utilized for experiments within problem area 1. Two Swedish versions of each of these three courses were planned, one computer-assisted and one traditional. However, only in two of them, YES 1 and Psychology, General Course, was it possible to obtain a sufficient number of students for this arrangement.

The Norwegian (NKS) version of YES 1 is a translation of the Swedish computer-assisted version of this course. A similar arrangement was planned with regard to the Norwegian (NKI) version of Physics, Elementary Course. As is shown in the table, however, the latter course could not be used as planned for experiments related to problem area 2.

Table 10. Courses distributed on subject and problem areas, according to the experiment plan.

Problem area	Subject area: *Languages*	*Social sciences, behavioural sciences*	*Mathematics, natural sciences*
1 Submission density	YES 1 (Hermods)	Psychology, General Course (Hermods)	Physics, Elementary Course (Hermods)
	[English–Basic Course (HFL)] [1]	Advanced Economics (RRC)	[Mathematics–Basic Course (HFL)] [1]
2 Assignments for submission–self-check tests	YES 1 (NKS)	Psychology of Management (Hermods)	[Physics, Elementary Course (NKI-skolen)] [2]
3 Type of two-way communication	YES 1 (Hermods)	Psychology, General Course (Hermods)	[Physics, Elementary Course (Hermods)] [3]

1) The West-German school HFL had to withdraw after the experiment plan was laid down, because of serious financial difficulties
2) Due to an unforeseen change of the course programme at the Norwegian NKI-skolen, the Norwegian version of Physics, Elementary Course could not be used
3) The number of applicants to the Swedish version of Physics, Elementary Course at Hermods was unexpectedly low during the years 1974–1976; therefore the planned experiment on different types of two-way communication could not be carried out.

Also the two West-German (HFL) courses had to be left out of the investigation. Consequently, five courses remain. One of them is British (Advanced Economics), while the others are Swedish (Psychology, General Course, Physics, Elementary Course, and Psychology of Management), or both Swedish and Norwegian (YES 1). YES 1 was used in three versions and Psychology, General Course in two. All the courses were arranged in three or four experimental variants.

The loss of four of the experiments that were originally planned does hardly mean any serious drawback. All the remaining eight experiments could be carried through independently of those which were cancelled. Nevertheless, the loss obviously diminishes the possibilities to generalize from the experimental results.

For a survey of all courses, course versions, and experimental variants actually utilized, see *table 11*.

As is clear from the table, in all courses/course versions related to problem area 1 (submission density), the experimental variant B (= the middle variant) has the same number of submissions–and the same number of assignment questions per submission–as the regular form of the course. In the experimental variant A, problem area 1, the assignments were divided into the double number of submissions. In the experimental variant C, problem area 1, the assignments were instead combined into half the regular number of submissions. This is shown, with regard to one of the course versions, in *table 12*.

It appears from the example in table 12, that the number of submissions–and, consequently, the submission density–is systematically varied in the experiments related to problem area 1.

Table 11. A survey of all courses, course versions, and experimental variants actually used in the experiments of sub-project 1

Course	Version	Student group	Used for experiments within problem area	Number of submissions					Number of assignment questions per submission				
				Regularly	*Experimental variant* A	B	C	D	*Regularly*	*Experimental variant* A	B	C	D
YES I	Hermods, computer-assisted	1974–75	1 and 3	4	8	4	2		24	12	24	48	
	Hermods, traditional	1975–76	1 and 3		8	4	2		8[1]	4[1]	8[1]	16[1]	
	NKS, computer-assisted	1975–76	2		8	8	4	4	24	12	6	12	6
Psychology, General Course	Hermods, computer-assisted	1975–76	1 and 3	4	8	4	2		16	8	16	32	
	Hermods, traditional	1974–75	1 and 3		8	4	2		8[1]	4[1]	8[1]	16[1]	
Physics, Elementary Course	Hermods, computer-assisted	1974–76	1	4	8	4	2		20	10	20	40	
Advanced Economics	RRC, traditional	1974–75	1	6	12	6	3		20[1]	10[1]	20[1]	40[1]	
Psychology of Management	Hermods, computer-assisted	1975–76	2	4	4	4	2	2	16[2]	16[2]	8[2]	16[2]	8[2]

1) As concerns the three courses/course versions with traditional two-way communication, the numbers of assignment questions per submission are approximated averages

2) In Psychology of Management, the first three submissions have got 16 assignment questions each; however, the fourth one has got only 12. (As a consequence, the number of submission questions in the last submission of the experimental variants B and D was only 6)

Table 12. The experimental variants of YES 1 (Hermods, computer-assisted)

Experimental variant	Number of submissions		Assignment questions per submission		Sum total of assignment questions
Variant A	8	x	12	=	96
Variant B	4	x	24	=	96
Variant C	2	x	48	=	96

Nevertheless, the total number of assignment questions was kept constant in this type of experiments, basically due to our hesitation whether it would be ethically justifiable to deprive one (or two) group(s) of participating students of half (or more) of the assignments, without replacing them–as in experiments related to problem area 2–by self-check tests with model answers and full comments.

In YES 1 (NKS) and Psychology of Management, the sum total of assignment questions was not kept constant, however. Only one of the four experimental variants has the regular total number of assignment questions. In the remaining three variants of each course/course version, half or three fourths of the assignment questions were used as extra self-check exercises with model answers and comments–all within the teaching material. As concerns YES 1 (NKS), this is evident from *table 13.*

Table 13. The experimental variants of YES 1 (NKS)

Experimental variant	Number of submissions		Assignment questions per submission		Sum total of assignment questions		Extra self-check exercises
Variant A	8	x	12	=	96		
Variant B	8	x	6	=	48	+	48
Variant C	4	x	12	=	48	+	48
Variant D	4	x	6	=	24	+	72

The *experimental designs* will be presented in section 4.5. In this section, a somewhat more detailed description of the courses and course versions will follow next, the description being mainly focused on characteristics of the assignments for submission and the two-way communication.

4.2.3 YES 1

YES 1 is a beginner's course in English for adults, worked out by Hermods and translated to Norwegian by NKS. The **teaching material** in the Norwegian version of the course is practically identical with the material in the Swedish edition.

YES 1 can be characterized as a commentary course (cf. 2.4.1) and comprises the following components:

- text and exercise book (128 pages)
- wordlist with comments on grammar (162 pages, small format)
- self-study guide (111 pages, small format)
- 2 audio tapes/cassettes (or 11 grammophone records).

In addition, separate sheets with assignments for submission are included.

Both the text and exercise book and the self-study guide contain a considerable number of self-check exercises. Model answers are provided in keys, however without comments.

In the self-study guide, the course writer often addresses himself directly to the student. The didactic style of this component could, to a certain extent, be described as "guided didactic conversation" (HOLMBERG, 1977b, 1978; cf. section 2.2.1).

The language teaching methodology applied in YES 1 is characterized by one of the course writers as an attempt to combine the unilingual direct method with the bilingual contrastive method (SÖRENSEN, 1971, p. 15–16).

All the **assignments for submission** require written answers. Nevertheless, certain details of pronounciation are tested, indirectly, in a minor number of the assignment questions. Other assignment questions test vocabulary, elementary accidence, and common phrases. For each submission in the *traditional* version, the students have also to translate a few sentences from Swedish to English. In this version, all the assignment questions require that the students compose the answers.

In the two *computer-assisted* versions of the course (Hermods and NKS), all the assignments for submission are worked out as multiple choice tests, because the CADE system requires this type of questions. (The assignments of the Norwegian version are completely parallel to the assignments of the Swedish computer-assisted version.) The multiple choice questions are designed to test the same elements of the course as the assignment questions in the traditional version.

Regularly, the assignments are provided on four occasions – i.e., the course has got four *submissions*. According to the pre-study (BÅÅTH, 1975), this should mean a fairly moderate estimated submission density – as an average about 13 net study hours (arithmetical mean) per study unit.

The Swedish experimental variants have 8, 4, and 2 submissions, respectively, and the Norwegian variants 8 and 4, respectively (cf. tables 11–13). For the three experimental variants with reduced numbers of assignment questions, NKS worked out one series of booklets containing *extra self-check exercises* and another containing answers with comments. All the extra self-check exercises are identical with the assignment questions that were omitted from the course. As far as possible, the answers with comments are in their turn identical with the comments provided by the CADE system to students' solutions of the corresponding assignments for submission.

With regard to the **two-way communication** of the *traditional* version, the general directions for Hermods' correspondence tutors are valid (*Handledning för granskande lärare*, 1972). In these directions the following points are emphasized:

1 The tutor's corrections and comments must be legible (p. 4).
2 His/her work must satisfy reasonable demands on objectivity and on correctness as to subject matter (p. 2, 6).
3 The tutor's task is by no means only to find and to correct mistakes, however, but also to teach by commenting on his or her corrections (p. 4). The comments must be appropriate to the student's level and should be worded in a straightforward way so as to be easy to understand (p. 6).
4 As far as possible, the comments should also be individualized; the tutor is therefore recommended to keep a special register comprising at least some of his students (p. 6).
5 Unless this is obvious from the other comments it must be evident from the final evaluation comment on each submission why the student got his or her particular mark (p. 11).
6 The tutor must be prepared to answer students' questions on the course content (p. 10).
7 Whenever appropriate, the tutor should also be prepared to give personal remarks and advice (p. 6). On the whole, the contacts between tutor and student should be as pleasant and personal as possible (p. 4, 9).

All the tutors taking part in the experiments were informed about the investigation and were asked to follow the general instructions at their school, correcting and commenting on the students' answers as they were used to.

In the traditional version of YES 1 at Hermods, only one tutor was involved. *Appendix 1* provides a typical example of her handling of students' assignment work. Apparently, the tutor has corrected all the errors and has written a comment on each correction. She has also marked the answers and concluded her corrections and comments by an evaluation comment. The handwriting is very legible. The tone of the comments can be characterized as matter-of-fact, not very personal.

As concerns the two-way communication of the *computer-assisted* versions, see section 4.3 where the CADE system is described. An example of computer-assisted tuition in YES 1 is shown in *appendix 2* (which, largely, parallels the example in appendix 1). As is clear from the introductory text in this computer-generated comment letter, additional printed model answers to some of the assignment questions are provided in the computer-assisted version of YES 1.

4.2.4 Psychology, General Course

Psychology, General Course (Allmän psykologi) is an upper secondary school level course in psychology. Its major goal is to provide basic theoretical knowledge and understanding of perception, motivation, and learning, as well as of developmental, differential, and social psychology. The course is also taken by students who do not aim at a qualification but have a general–not seldom more practically directed–interest in psychology.

Psychology, General Course, is an "independent" correspondence course (cf. 2.4.1). The **teaching material** consists of a book of 336 pages, and a booklet containing assignments for submission.

There is a great number of self-check exercises (in all, 210) in the book. As a rule, they aim at cognitive processing (understanding, application) of the learning material. Model or sample answers with full comments are provided.

Except for the self-check exercises, the course writer seldom addresses himself directly to the student. On the whole, the style can be characterized as matter-of-fact.

As is the case with YES 1, there are two versions of the **assignments for submission**, one for traditional two-way communication and another for computer-assisted communication. Practically all the assignment questions in the *traditional* version require that the students compose their answers. To use the taxonomy of BLOOM (1956), the assignment questions are intended to test not only knowledge but–to a considerable extent–also comprehension and application.

All the assignment questions in the *computer-assisted* version are of the multiple choice type. As far as possible, these questions are designed to test the same elements of the course as the assignment questions in the traditional version. Yet, in some cases the questions in the two versions do not parallel each other. As in the traditional version, the majority of the multiple-choice questions are intended to test comprehension and application.

The regular number of assignment *submissions* is four. According to the pre-study (BAATH, 1975), this indicates a rather low estimated submission density–about 19 net study hours per study unit, as an average (arithmetical mean). As is clear from table 11, the experimental variants of the course have 8, 4, and 2 submissions, respectively.

A typical example of the postal **two-way communication** provided in the *traditional* course version is included as *appendix 3*. As in YES 1, only one tutor was involved. Also she obviously tries to follow, largely, the general directions which were summarized on p. 61. She may sometimes overlook an error (here: item 1 N), but, on the whole, she corrects errors and provides comments and/or indicates the correct answer. In addition, she gives not only a final mark but also a concluding comment of evaluation. The tutor's handwriting is not very legible but possible to interpret. The comments are rather short, and the tone is matter-of-fact, although the concluding comments are often worded in a kindly way (as in this example).

An example of *computer-assisted* tuition in Psychology, General Course, is shown in *appendix 4* (which corresponds to 3, although – as has already been mentioned – the two sets of assignment questions are not completely parallel). For a description of the CADE system, see section 4.3.

4.2.5 Physics, Elementary Course

Physics, Elementary Course (Grundkurs i fysik) is a basic course in physics for adults. It deals with mechanics, electricity, wave motions and nuclear physics. It aims at lower secondary school qualifications in the subject but is nevertheless, to a considerable extent, practically directed.

Physics, Elementary Course, is an "independent" correspondence course (cf. 2.4.1). The **teaching material** consists of four booklets of 206 pages, in all. The assignments for submission are printed separately.

Each study booklet contains a number of "self-tests", without answers or comments. It is assumed that the students should be able to check their answers themselves by means of the preceding study text. The style is matter-of-fact. The course writer hardly ever addresses himself directly to the student.

The **assignments for submission** are of the multiple choice type. Largely, they test the students' ability to apply their knowledge to new examples and situations.

The regular number of *submissions* is four, which should imply a moderate estimated submission density: as an average (arithmetical mean) 12 net study hours per study unit (BAATH, 1975). The experimental variants of the course have 8, 4, and 2 submissions, respectively (cf. table 11).

The **two-way communication** in Grundkurs i fysik is of the *computer-assisted* type (cf. 4.3). To some of the assignment questions, printed model answers are provided.

4.2.6 Psychology of Management

Psychology of Management (Arbetsledningens psykologi) is an elementary course in psychology for prospective as well as for already established foremen, supervisors and the like. It deals mainly with practical problems which may arise in workshops and offices, and possible solutions are discussed. Among areas covered, the following can be mentioned: interviews, introduction of new employees, training and instruction, leadership, group dynamics, motivation, frustration and stress, giving orders, giving and taking criticism.

Psychology of Management is an "independent" correspondence course (cf. 2.4.1). The **teaching material** consists of four study booklets of 176 pages, in all, one booklet containing a survey with exercises for review, and another booklet with assignments for submission.

The study booklets contain a number of self-check exercises (about 50), which mainly aim at application of knowledge. As a rule, they start from concrete cases in hypothetical workshops or offices. As in the other courses, the style is matter-of-fact. Only in the self-check tests, explicit attempts at establishing a "guided didactic conversation" is discernible.

The exercises for review in the separate survey booklet are of the same kind as the self-check tests in the study booklets.

The **assignments for submission** are designed as multiple choice questions. About half of them are intended to test knowledge (BLOOM, 1956), whereas the rest are aimed at application and (to some extent) comprehension.

The regular number of *submissions* is four, which means a comparatively high submission density, according to the pre-study (BAATH, 1975): about 6.5 net study hours per study unit, as an average (arithmetical mean).

The four experimental variants of the course have four and two submissions, respectively (cf. table 11). For the three experimental variants with reduced numbers of assignment questions, Hermods worked out one series of booklets containing *extra self-check tests* and another containing answers with comments. As in the NKS version of YES 1, all the extra self-check exercises are identical with the omitted assignment questions. The answers with comments are in their turn, as far as possible, identical with the comments given by the CADE system to students' solutions of the corresponding assignments for submission.

The **two-way communication** in Arbetsledningens psykologi is computer-assisted (cf. 4.3). An example, translated into English, is given in *appendix 5*.

4.2.7 Advanced Economics

Advanced Economics is specifically intended for those students who are preparing for the Economics paper of the English General Certificate of Education at Advanced Level. It can thus be characterized as a high-level upper secondary school course for adults. Both economic theory and applied economics are dealt with.

Advanced Economics is an "independent" correspondence course. The **teaching material** consists of six booklets of, in all, 606 pages. In addition, the students are recommended to study the "Economic Supplements" containing notices of current interest, which are published regularly by the school, the Rapid Results College (RRC), in connection with this course.

The booklets are divided into a number of "lectures", each lecture being concluded by a short series of "Likely examination questions" of essay type. In some cases specimen answers are provided. The style is extremely matter-of-fact. Both course writer and students are anonymous – practically no sign of a "guided didactic conversation" can be traced in these booklets.

The **assignments for submission** consist mainly of essay questions, but to a certain extent also of multiple choice questions. All the questions are taken from past examination papers.

The regular version of Advanced Economics has got six assignment *submissions*. Since the course was not yet published in 1974, when the pre-study (BÅATH, 1975) was undertaken, no estimation of the submission density could be made beforehand. However, according to another study within the framework of the research project (BÅATH, 1976b), the estimated submission density is generally low in RRC courses (as an average, about 24 net study hours per study unit). – The experimental variants of the course were given 12, 6 and 3 submissions, respectively (cf. table 11).

With regard to the **two-way communication**, the following general directions for correspondence tutors at the RRC (*Notes for the guidance of correcting tutors*, w.y., p. 2) should be followed by the tutor:

1 The handwriting must be legible.
2 The tutor should point out and correct not only mistakes, vagueness and omissions but also irrelevant details in the students' solutions.
3 For each answer, a separate mark should be given. Whenever a maximum mark cannot be given, the reason for the reduction should always be evident from the tutor's comment. (A general reference to a printed specimen answer enclosed is not enough – the tutor must also point out what to observe in the specimen answer.)
4 In addition to the total marks (calculated in per cent), the tutor should provide a summarizing comment. This need not be worked out according to any particular pattern but should always be worded in an encouraging way.
5 The tutor is recommended to keep a special register of his students in order to be able to provide appropriate summarizing comments with regard to each student's individual progress from study unit to study unit.
6 The tutor is also recommended to keep all his writings to the students in a personal, friendly tone.
7 Finally, against a special fee, the tutor should answer course-relevant questions from the students.

Although we find some minor differences, these directions are essentially the same as those given to the correspondence tutors at Hermods (see 4.2.3).

The Advanced Economics tutor's[1] handling of students' solutions can be briefly described in the following way: his handwriting is legible, and his comments are throughout kindly, encouraging. So far, the tutor follows the directions of the RRC. The comments are utterly laconic, however. Sometimes there is no explanation why a maximum mark has not been given. Despite the friendly tone, the comments are hardly worded in a personal style.

In Advanced Economics, full printed specimen answers are always enclosed, in addition to the tutor's comments.

4.3 The CADE system

As is obvious from section 4.2, the following courses/course versions, used in the experiments, had computer-assisted two-way communication:

- YES 1 (the Norwegian version, and one of the two Swedish versions)
- Psychology, General Course (one of the two versions)
- Physics, Elementary Course
- Psychology of Management.

In all these cases, the CADE system was utilized.

The name "CADE" is derived from the expression Computer-Assisted Distance Education. A few fundamental features of the system were described in section 2.5.10, where the main results from an evaluation of the system were also reported. For a full account of the system, see BÅATH & MANSSON (1977). In this section, I will try to demonstrate somewhat more in detail how the computer-generated comment letters are built up and which instructional degrees of freedom the system permits.

The CADE system requires that the assignments for submission are of the multiple choice type. The student marks his answers on a special answer blank. They are registered by an optical reader, which produces a tape. This tape is put into a computer, which processes the information given, collects appropriate comments from one of its secondary memories, and – as an end product – prints out a letter commenting on the student's answers. This letter corresponds to the correspondence tutor's manual corrections and comments in traditional two-way communication.

A CADE comment letter consists of five main parts:

1 Identification (tutor, student, course, submission number)
2 Introduction
3 Instructional comments
4 Evaluation
5 Concluding phrase.

The *introductory texts* are common to all the courses. However, there are nine different texts for the computer to choose from, and this fact allows considerable variation. The introduction may be extended by a text referring to printed model answers, which are manually enclosed. This text is also available in different versions. Therefore, a student never receives the same introductory text on two successive occasions.

The *instructional comments* are of two kinds:

- comments on single answers
- "special" comments.

1) Also in this course, only one tutor was involved in the experiment.

Comments on single answers provide the number of the question + the letter signifying the correct answer + the alternative chosen by the student + a comment for explanation (often including a short discussion and/or suggestions for review). The explanation can be varied depending on which alternative the student has chosen. As a matter of routine, all incorrect answers to single questions are commented on in this way. However, the tutor designing comments for the system may also comment on (certain) correct answers.

The *"special" comments* can be used most flexibly. For instance, it is possible to

- provide a comment referring to a group of answers, or to the whole study unit
- refer to a student's answer(s) to one or more questions on an earlier submission occasion.

A rather complex special comment is shown in the example from Arbetsledningens psykologi (*appendix 5*). On the previous submission occasion the student had answered a certain question correctly. Moreover, he has answered two related questions correctly on this occasion. The computer combines these data and provides the following comment:

> We agreed in unit 1 (question 12) that it is important, during an interview, that the interviewee also can put forward his questions. In the same way, one ought to allow and even encourage questions during *introduction* and training. This, too, seems to be quite clear to you, judging from your answers to items 3 and 5 – good!

The comment designer may work out a maximum of five "special" comments for each study unit (submission occasion).

The *evaluation* part states the student's number of correctly answered questions, and his total mark. In addition, it provides a concluding overall comment. Like the introductory texts, the concluding comments are generally common to all CADE courses. The computer can choose between 39 different concluding comments. Its choice depends on the student's achievement on the particular submission occasion, as well as on his results on the previous occasion. In addition, each variant is available in three verbally different versions.

The concluding comments have – as far as possible – been worded in a friendly, encouraging way. Something similar might be said with regard to the CADE comment letter as a whole. Moreover, the comment designers often address themselves directly to the student, which may lend a comparatively personal touch to the letter, although – largely – it keeps strictly to facts.

The student writes questions and/or comments (if any) on the back of the answer blank. The tutor in charge provides a reply, as a rule by adding a manual postscript to the computer-printed comment letter.

Generally, CADE comments are considerably more extensive than manual comments given by correspondence tutors in traditional two-way communication. According to a calculation, an average CADE letter comprises about 300 words (BÅATH & MANSSON, 1977, p. 38). Apparently, this is several times more than is usual in traditional two-way communication (cf. HARRIS, 1975: British correspondence tutors tend to regard comments of 20–50 words per submission occasion as sufficient).

When we designed the CADE system, one of our aims was to shorten the *turn-round time* of students' answers (BÅATH & MANSSON, 1977, p. 12). Potentially, the turn-round time of CADE solutions is also considerably shorter than what is usually possible in traditional two-way communication. However, this potential is hitherto far from fully utilized, which would imply computer runs every workday. During the experiment period, CADE answers were computer-processed twice a week at Hermods, and once a week at NKS. As regards Hermods, this resulted in an

average total turn-round time – from student back to student – of about seven days (cf. BAATH & MANSSON, p. 28). This is about two or three days shorter than what can be expected, as an average, in traditional postal two-way communication at the same school.

4.4 Student sample and randomization

4.4.1 Sample

All the students who applied for one of the experiment courses during the period in question were included in the investigation, yet with three exceptions:

- only adult students (conventionally defined as 18 years old or above) were accepted as subjects of the experiments (cf. section 4.2.1, point 2)
- only students who studied altogether on their own were included (i.e., no participants in correspondence study combined with study circle or any other kind of face-to-face study), on the ground that the experimental situation should be kept as pure as possible
- those students were omitted who studied one of the experiment courses as part of an extensive course programme (cf. 4.2.1, point 5).

Consequently, the population can be defined as adult correspondence students studying on their own who take one of the courses referred to either as a single subject course, or as part of a course programme including only one or two more courses. (Thus defined, the population comprises a very clear majority of all the students of the experiment courses, registered during the intake period.) From this population, every student who registered for one of the courses in question during the data collection period was taken as a subject of the experiments. In this sense, the experiments can be conceived as studies of a total population. Nevertheless, in those cases where statistical treatments are reported in this thesis, results of significance testings of differences will also be provided. This may be regarded as a service to those readers who prefer to regard the experiments as sample studies.

4.4.2 Randomization

On their application for the course, the students were randomly allocated to one of the experimental course variants described in section 4.2.

For administrative reasons, the students' application numbers were used as a starting point of the randomization at Hermods and the RRC. These numbers are provided by the schools to new applicants in a consecutive order, irrespective of course. (Yet, previous students registering for a new course may keep their old number if they state it on their application.) Thus, the application numbers are not consecutive in one particular course. Therefore, the following directions were followed for experiments including

three groups: to the first group, those students were allocated who had got an application number, the two last digits of which were 00–32 (real numbers, i.e., control digit – if any – not included), to the second group, correspondingly, students with 33–66 as last digits, and to the third group, 67–99 students

four groups: To the first group, those students were allocated who had got an application number, the two last digits of which were 00–24, to the second group, correspondingly, students with 25–49 as last digits, to the third group, 50–74, and to the fourth group, 75–99 students.

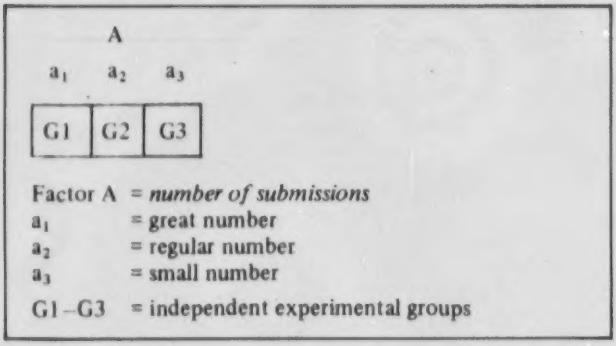
However, at NKS it was feasible to distribute students into experiment groups depending on the order in which their course applications arrived. Thus, the first student who applied during the experiment period was allocated to group 1, the second student to group 2, etc.

4.5 Experimental designs

4.5.1 Design 1

The first design was utilized in experiments related to **problem area 1**, the submission density of correspondence courses. The design is one-factorial with independent groups. See *box 1*.

Box 1. Design of experiments on submission density (*design 1*)



Varying the number of assignment submissions in a course means varying its submission density (cf. the definition of submission density, section 1.6). Table 11 shows which values the three levels of the factor "number of submissions" assume: 8, 4, and 2 in YES 1 (the two Swedish versions), Psychology, General Course (both versions), and Physics, Elementary Course; 12, 6, and 3 in Advanced Economics.

How the total number of assignment questions was kept constant in these experiments is obvious from table 12. (Cf. table 11, the columns "Number of assignment questions per submission".)

4.5.2 Design 2

The second design was used in experiments intended to shed light on **problem area 2**, the possibility of replacing a substantial part of the assignments for submission by self-check exercises. The design is 2 x 2 factorial with independent groups. See *box 2*.

There are two independent variables which describe this design, namely the factors "number of submissions" and "number of assignment questions per submission", both with two levels. By this design, the total number of assignment questions per submission could be varied from the regular one to a small or very small number – e.g., from 96 for group G1 to 24 for group G4, as concerns YES 1 (Norwegian version). The design makes it also possible to study, simultaneously, (1) the effects of varying the number of submissions in a course; (2) the effects of varying the number of assignment questions per submission in the same course; (3) interactions between these two variables.

As can be seen in box 2, this design has two variants. The difference concerns the levels of the two factors. The reason for this disparity is the difference found in the

Box 2. Design of experiments on partial replacement of assignments for submission by self-check exercises (*design 2*)

		A	
		a_1	a_2
B	b_1	G1	G2
	b_2	G3	G4

Design 2a: YES 1, Norwegian version

Factor A = *number of submissions*
a_1 = great number (8)
a_2 = regular number (4)

Factor B = *number of assignment questions per submission*
b_1 = small number (12)
b_2 = very small number (6)

G1–G4 = independent experimental groups

Design 2b: Psychology of Management

Factor A = *number of submissions*
a_1 = regular number (4)
a_2 = small number (2)

Factor B = *number of assignment questions per submission*
b_1 = regular number (16)
b_2 = small number (8)

G1–G4 = independent experimental groups

pre-study between YES 1 and Psychology of Management (see 4.2.3 and 4.2.6) as concerns estimated submission density (= net study time per study unit; cf. 2.5.3). In its regular version, Psychology of Management has a comparatively high estimated submission density (about 6.5 net study hours per study unit). Therefore, it was not considered reasonable to double the number of submissions in this course experimentally and, by that, further to increase the submission density in two of the experimental variants of this course. As a contrast, the estimated submission density of YES 1 was only half as high as that of Psychology of Management (about 13 net study hours per study unit). It was therefore considered more sensible to vary the number of submissions upwards in this course.

The difference between the two courses with regard to levels of the factor "number of submissions" has, in its turn, influenced the choice of levels as concerns the factor "number of assignment questions per submission". In each case, the point of departure was the regular total number of assignment questions, 96 (4 x 24, YES 1) and 60 (3 x 16 + 12, Psychology of Management). One of the experimental groups (G1) should keep the regular total number of assignment questions. In both courses, all the other three groups (G2–G4) should get the total number of assignment questions reduced by one half or three fourths. Since, however, the number of submissions was varied upwards in YES 1 but downwards in Psychology of Management, the levels of the factor "number of assignment questions per submission" had to be different in the two courses. (Cf. table 11.)

As has been previously mentioned, all the omitted assignment questions for submission (groups G2–G4 in both courses) were used as self-check exercises.

4.5.3 Design 3

The third design refers to **problem area 3**, the comparison between traditional and computer-assisted two-way communication in correspondence education. The design is 2×3 factorial with independent groups. See *box 3*.

Box 3. Design of experiments where traditional two-way communication is compared with computer-assisted communication (*design 3*)

		A		
		a_1	a_2	a_3
B	b_1	G1	G2	G3
	b_2	G4	G5	G6

Factor A = *number of submissions*
a_1 = great number
a_2 = regular number
a_3 = small number

Factor B = *type of two-way communication*
b_1 = traditional
b_2 = computer-assisted

G1–G6 = independent experimental groups

As is evident from box 3, this design is also described by two independent variables, namely the factors "number of submissions" – with three levels as in design 1 – and "type of two-way communication", with two levels: traditional and computer-assisted. This design makes it possible to study, simultaneously, the effects of varying the number of submissions in a course; the effects of varying the type of two-way communication in the same course; interactions between these two variables.

In the two experiments carried out according to design 3, the students were not completely randomized, however. As was indicated in table 11, subjects were allocated to groups with traditional and computer-assisted tuition, respectively, from two subsequent cohorts of students. Properly speaking, there is no reason to assume that the two cohorts should not be comparable (cf. REKKEDAL, 1973b). We cannot take it for granted that this is the case, however. Therefore, the comparability of these two experimental groups has been analysed. The result will be shown in section 4.7.2.

4.6 Instruments for data collection

4.6.1 The instruments used

Table 14 provides a survey of the instruments used for data collection, as well as of the types of data collected by means of these instruments. All the instruments were constructed specifically for the research project.

Table 14. A survey of the instruments used for data collection and of the data collected

Instruments	Data
	A *Intake data*
Enrolment questionnaire	Background information about the students
	The students' motives for studying
	The students' motives for choosing correspondence study
"Non-answerer questionnaire"	Certain background information about students who did not return the enrolment questionnaire
	B *Outcome data*
Special register of students	Study perseverance (start, completion)
	Gross study time
	Net study time
Final questionnaire	Completers' experiences of and attitudes to the teaching and the studies
"Dropout questionnaire"	Non-completers' experiences of and attitudes to the teaching and the studies, as well as their causes/reasons for discontinuing (etc.)
Final test	Completers' achievements after the course

Enrolment questionnaire. When a student had applied for one of the experiment courses, he or she received – in addition to the course material – certain information about the investigation and also an enrolment questionnaire. This questionnaire contains questions on background variables, motives for studying and motives for choosing correspondence education. The following variables are dealt with in this questionnaire, which is common to all the three sub-projects[1]:

1 sex
2 age
3 marital status
4 study situation
5 occupation
6 educational level
7 previous experience of correspondence study
8 parallel correspondence study
9 motives for studying
10 motives for studying by correspondence.

The variables 1–6 and 9 in the enrolment questionnaire were described in detail by FLINCK (1978, p. 40–43).

The enrolment questionnaire variable 7 refers to previous participation in correspondence study. REKKEDAL (1978) demonstrates that previous favourable experience of correspondence education is a good predictor of course completion. The majority of former correspondence students who apply for new courses are probably those whose previous experiences of this study form are favourable. Variable 7 is therefore, most likely, of interest (cf. also WÄNGDAHL, 1979). The variable can assume two values: previous experience, no previous experience.

1) The sub-projects were shortly described in section 3.3.

Parallel study of one or two correspondence courses, in addition to the experiment course, might affect outcome variables like gross study time and study perseverance. (Cf. 4.2.1, point 5, and 4.4.1, on students studying an extensive course programme.) Therefore, variable 8 was included in the enrolment questionnaire (this variable, too, with only two values: parallel study, no parallel study).

Finally, the enrolment questionnaire contains a number of statements concerning the students' *motives for choosing correspondence education* as their study form (variable 10). As was the case with the motives for studying, irrespective of study form (variable 9), the students were asked to consider how much each reason that was suggested meant to them personally. The answers were factor analysed, and three factors emerged (BÅATH ET AL., in preparation).

The first factor (factor A) is apparently related to *supposed advantages of the study form.* The following statements fell out in this factor:

> I prefer studying on my own by correspondence instead of studying in a group with other people
>
> I like working by myself
>
> I can work at my own pace if I study by correspondence
>
> Correspondence study will make it easier for me to plan my work and assess my progress than if I studied completely unaided.

Both the second and the third factor (factors B and C) concern external conditions which make correspondence education stand out as, practically, the only possible way of studying. Factor B seems to be related to situations where *the student's employer or geographical circumstances preclude the choice of another study form.* The following two statements fell out in this factor B:

> My employer has directed me to take this course and I have not had any choice
>
> There are no possibilities other than a correspondence course as there are no evening classes etc. where I live.

Factor C concerns *practical difficulties to combine one's work with another study form*:

> My work (occupation) makes it impossible to take part in evening courses etc.

"Non-answerer questionnaire". A minor number of the participants did not return the enrolment questionnaire, in spite of reminders. Since the enrolment questionnaire is rather extensive and should be answered personally, we tried to obtain at least some information from the non-answerers, by means of a considerably shortened version which could be returned anonymously – the so-called non-answerer questionnaire. This attempt was not very successful, however. Only 14 non-answerer questionnaires were returned (= 8 per cent of those sent out). They were not subjected to analysis.

Special register of students. Each school taking part in the investigation set up a special register for the experiment courses. As concerns those students who did not return the enrolment questionnaire, information about one background variable was secured from this register, namely sex. From the same register the following outcome data were taken: information about start, completion, gross study time and net study time. Data on net study time were brought to the register by the students themselves, who reported their number of actual study hours on each submission occasion.

Final questionnaire. All the participating students who had sent in answers on every submission occasion received a final questionnaire. This contains questions intended to measure

1 the overall attitude to the course and the teaching
2 the attitude to the assignments for submission

3 the attitude to the type of assignment questions
4 the attitude to the correction of and commenting on students' assignments
5 the attitude to the submission density
6 the attitude to the number of assignment questions per submission
7 the attitude to replacing assignments for submission by self-check exercises
8 the feeling of isolation in the study situation
9 the wish for other kinds of support in the studies than can be provided by means of pure correspondence education.

Variable 5 is relevant specifically to experiments directed to problem area 1. Likewise, variables 6 and 7 were intended specifically for experiments on problem area 2, and variable 3 for experiments on problem area 3. Nevertheless, for practical reasons the final questionnaire was common to all the experiments within sub-project 1.

"Dropout questionnaire". As has previously been pointed out (2.8.1), the proportion of non-completers is comparatively great in almost all forms of non-compulsory part-time adult education. Since correspondence education is no exception to this, we worked out a particular dropout questionnaire intended for those students who would not send in answers on all the submission occasions. As criterion of dropping out we chose passiveness (i.e., no assignments submitted) during a period of six months (cf. 2.8.1).

The major part of the dropout questionnaire contains questions which are identical with, or parallel to, questions in the final questionnaire. In addition, there are a minor number of questions asking why the students stopped submitting assignments (or never started doing so) and how they regard their study situation. The questionnaire starts with questions within this latter category, intended for all non-completing students. Then there is a gradual differentiation depending on how much work the student has done on the course and – consequently – what basis for answering each group of questions he or she has acquired.

Final test. For each experiment course, a final test was designed by one of the participating schools. This means that, in all, five tests were constructed: for YES 1 (all three versions), Psychology, General Course (both versions), Physics, Elementary Course, Advanced Economics, and Psychology of Management. All the final tests contain both multiple choice questions and free answer questions. See *table 15*.

Table 15. Final tests

Course	Number of multiple choice questions	Number of free answer questions	Maximum total points
YES 1	20	20	40
Psychology, G.C.	20	20	40
Physics, E.C.	16	8	40
Advanced Economics	15	2[1)]	55
Psychology of M.	20	10	30

1) very comprehensive essay questions

With regard to the experiments according to design 3, it was emphasized that the final tests for YES 1 and Psychology, General Course must not favour any student group, the groups having had different types of assignment questions during their course (traditional version: free answer questions, computer-assisted version: multiple choice questions). Therefore, one half of each of these tests consists of multiple choice questions and the other half of free answer questions. The halves are comparable: For each multiple choice question, there is a parallel free answer question on the same or a similar topic. In addition, the questions of the two halves were mixed, yet in such a way as to prevent two parallel questions from standing next to each other.

4.6.2 The collection of data

As has been pointed out in section 2.8.3, correspondence students are generally free to study at their own rate, within wide limits. At most correspondence schools they can also apply for a course and start their study whenever they wish. This lack of fixed time schedules implies certain difficulties with regard to the techniques of investigation. No questionnaires or final tests could be sent out on one specific occasion; instead, we had to wait for students to apply, one by one, for the experimental courses and, in a similar way, to wait for them to complete – or to drop out. It is therefore no wonder that the periods of investigation grew comparatively long.

In *table 16* the periods of data collection are shown. As can be seen, the duration of the intake periods varies from 7 to 22 months. The main reason for this considerable variation is an endeavour to obtain a desirable number of participants in the experiment courses (see 4.2.1, point 3); to some degree, administrative points of view on the part of the schools had also to be considered.

In addition, the total period of data collection is varying. As a consequence, the period available for a student to be able to be registered as a completer varies both within courses (different intake data for various students but common final date for data collection) and between different courses. Due to the random distribution of participants into different experimental groups, the variation *within* courses hardly creates any problems. However, in order that the computer-assisted and traditional groups in the experiments according to design 3 should be comparable, the variation *between* the different versions of YES 1 and Psychology, General Course, respectively, had to be eliminated. To this end, 6 completers in the YES 1 computer-assisted version[1)] and, in addition, 6 completers in the Psychology, General Course traditional version[2)] were regarded as non-completers.

Table 16. Periods of data collection. Period of intake = period during which students were allocated to the experimental groups and obtained course material, information and the enrolment questionnaire. End = final date for data collection. H = Hermods

Course/course version	Period of intake	End
YES 1 (H, computer-assisted)	1.9 1974–31.4 1975	31.8 1977
YES 1 (H, traditional)	1.8 1975–31.3 1976	31.8 1977
Psychology, G.C. (computer-assisted)	1.8 1975–31.3 1976	31.8 1977
Psychology, G.C. (traditional)	1.9 1974–31.7 1975	31.8 1977
Physics, E.C.	1.9 1974–31.7 1976	31.8 1977
Advanced Economics	1.10 1974–30.4 1975	30.9 1976
YES 1 (NKS)	1.1 1975–31.7 1976	31.5 1977
Psychology of Management	1.2 1975–31.7 1976	31.8 1977

1) For YES 1, the *traditional* version, the total period of data collection comprised 25 months. Therefore, all the students (= 6) of the *computer-assisted* version who completed their course after 31.9 1976 (i.e., 25 months after the beginning of the data collection) were regarded as non-completers. By this, the two groups were equalized with regard to time available for course completion.

2) For Psychology, General Course, a somewhat more complex operation had to be undertaken. As for YES 1, the difference between the versions with regard to total period of data collection was 11 months. However, the difference as concerns the minimum period available for a student to complete the course was only 8 months (from 31.3 1976 to 31.8 1977 = 17 months; from 31.7 1975 to 31.8 1977 = 25 months). Therefore, those students (by coincidence, also 6) of the *traditional* version who completed their course after 31.9 1976 (i.e., 25 months after the beginning of the data collection) were regarded as non-completers, *provided that* they had enrolled before 1.5 1975 or – if they had enrolled this date or later – used more than 17 months for their studies.

The *dropout questionnaire* was sent to students when they had been passive for 6 months, i.e., if they had not sent in any solutions during this period. (We wanted the non-completers' experiences of their course to be comparatively fresh – in order that they should be able to answer the questionnaire questions. Therefore, we decided not to postpone sending out the dropout questionnaires until the last months of the data collection period.)

About one tenth (127, to be precise) of the passive students to whom the dropout questionnaire was sent became active later on. No less than 60 of them also completed their course within the period of data collection. These students are regarded as completers. In so far as they returned the final questionnaire, data obtained by means of this instrument have been utilized in the investigation instead of their answers – if any – to the dropout questionnaire.

For administrative reasons, the *final test* was taken by the students in their homes. The participants had to fill in and enclose an affirmation that they had answered the questions on their own within the time allowed and without any other aids than those permitted.

Reminders of questionnaires and final tests were sent out when needed. As a rule, a maximum of two written reminders were used. In addition, one additional reminder was – where possible – provided by telephone. A new copy of the questionnaire/test was sent with the second reminder.

4.7 The students

In all, the sample comprised 1805 persons who were allocated to the various experimental groups. For various reasons, 55 of them (3.1 %) dropped completely out of the investigation. A survey of these individuals will be given in section 4.8.1. Henceforth, when I refer to "the students", "the participants", or "the subjects of the experiments", I have the remaining 1750 individuals (or groups of them) in mind.

In this section, I will first give an overview of returned and not returned enrolment questionnaires from the 1750 participants. In connection with this, I will present some data on the students who did not answer this questionnaire. After that, a description of the students will be provided, by means of data from the enrolment questionnaire. These data will also be utilized for an analysis of the outcome of the randomization. Finally, I will shortly discuss to what extent the subjects of the experiments are representative of correspondence students in general.

4.7.1 Returned enrolment questionnaires

Table 17 shows the distributions of participants and of returned/not returned enrolment questionnaires with regard to each course/course version and experimental group.

As is evident from the table,

- the proportion of returned questionnaires is, in all, 90.0 per cent; it varies between courses from 93.6 per cent (Psychology of Management) to 83.4 per cent (Physics, Elementary Course).
- in some cases, the proportion of returned questionnaires also varies considerably between the experimental groups (e.g., in Physics, Elementary Course); however, no uniform pattern can be discovered.

We also see that in one course – Psychology of Management – the desirable number of participants (around 200; cf. 4.2.1, point 3) was not reached.

Appendix 6, table 18 provides some data on those 175 participants who did not return the enrolment questionnaire. A great majority (85.1 per cent) of these students

did not start submitting any assignments. Yet, there is among them a minor group (11 individuals) who not only started sending in answers but also completed their courses. When reminded, most of these students declared that they, on principle, never answer questionnaires.

Table 17. Returned/not returned enrolment questionnaires, distributed on courses/ course versions and experimental groups

Course/course version and experimental group	Students		Enrolment questionnaires returned		not returned	
	f	%	f	%	f	%
YES 1 (H, comp.-ass.)	*221*	*100.0*	*198*	*89.6*	*23*	*10.4*
8 submissions	79	35.7	72	91.1	7	8.9
4 »	77	34.8	73	94.8	4	5.2
2 »	65	29.4	53	81.5	12	18.5
YES 1 (H, traditional)	*210*	*100.0*	*180*	*85.7*	*30*	*14.3*
8 submissions	58	27.6	45	77.6	13	22.4
4 »	85	40.5	75	88.2	10	11.8
2 »	67	31.9	60	89.6	7	10.4
Psychology, G.C. (c.-ass.)	*214*	*100.0*	*199*	*93.0*	*15*	*7.0*
8 submissions	71	33.2	65	91.5	6	8.5
4 »	74	34.6	68	91.9	6	8.1
2 »	69	32.2	66	95.7	3	4.3
Psychology, G.C. (trad.)	*202*	*100.0*	*188*	*93.1*	*14*	*6.9*
8 submissions	65	32.2	62	95.4	3	4.6
4 »	61	30.2	56	91.8	5	8.2
2 »	76	37.6	70	92.1	6	7.9
Physics, E.C.	*193*	*100.0*	*161*	*83.4*	*32*	*16.6*
8 submissions	66	34.2	60	90.8	6	9.1
4 »	64	33.2	45	60.3	19	29.7
2 »	63	32.6	56	88.9	7	11.1
Advanced Economics	*321*	*100.0*	*291*	*90.7*	*30*	*9.3*
12 submissions	114	35.5	100	87.7	14	12.3
6 »	102	31.8	96	94.1	6	5.9
3 »	105	32.7	95	90.5	10	9.5
YES 1 (NKS)	*249*	*100.0*	*227*	*91.2*	*22*	*8.8*
8×12 ass.questions	60	24.1	55	91.7	5	8.3
8×6 »	63	25.3	60	95.2	3	4.8
4×12 »	63	25.3	55	87.3	8	12.7
4×6 »	63	25.3	57	90.5	6	9.5
Psychology of Managem.	*140*	*100.0*	*131*	*93.6*	*9*	*6.4*
4×16 ass.questions	38	27.1	37	97.4	1	2.6
4×8 »	34	24.3	33	97.1	1	2.9
2×16 »	31	22.1	30	96.8	1	3.2
2×8 »	37	26.4	31	83.8	6	16.2
Σ	*1750*	*100.0*	*1575*	*90.0*	*175*	*10.0*

4.7.2 A description of the students, with an analysis of the randomization

The following description of the participants is wholly based on data from returned enrolment questionnaires. In connection with this description, the outcome of the randomization will be analysed. The analysis was performed by means of the χ^2 test (tables 19–23) and the F test (tables 24–25). In order to reduce the risk of Type II errors, $\alpha = 0.10$ was chosen as a reasonable level of significance.

For each variable, I start with a description of the students. Then follows a short discussion of the randomization analysis, first as concerns experiments according to designs 1 and 2, and then with regard to the design 3 experiments.

In *appendix 6*, *table 19* is shown that the distribution with regard to **sex** varies considerably between the experiment courses. Female students dominate in Psychology, General Course, whereas Advanced Economics and Psychology of Management mainly attract male participants. In YES 1 and Physics, Elementary Course, the students are more evenly distributed.

In three cases, the sex distribution of experimental groups within the same course/course version diverges from the expected distribution: in Physics, Elementary Course, Advanced Economics, and YES 1 (NKS). However, if the students who did not return the questionnaire are included, the differences with regard to Advanced Economics and YES 1 (NKS) are eliminated. Thus, in these two cases the circumstance that some enrolment questionnaires were not returned made the distribution more askew than it originally was.

As concerns the sex distribution, no differences were found between the two Swedish versions of YES 1, neither between the two versions of Psychology, General Course.

The **age** distribution also varies considerably between courses, according to *appendix 6*, *table 20*. In YES 1 (all three versions) the average age is unusually high, compared with the age of correspondence students in general (cf. section 2.3). No less than two thirds (67.1 per cent) are over 30 years old; slightly more than one third (35.7 per cent) are above 40, and about one sixth (16.9 per cent) above 50. The most conspicuous contrast is offered by Advanced Economics, in which no more than around 15 per cent of the students are over 30 years of age. Also Psychology, General Course, attracts comparatively young participants (61.7 per cent $\leqslant$ 30 years of age, out of whom 22.4 per cent $\leqslant$ 20 years old).

In no course/course version does the age distribution of experimental groups differ significantly from the expected distribution. This applies also to the comparisons between different versions of YES 1 (Hermods) and Psychology, General Course (design 3 experiments).

Appendix 6, *table 21* shows the distribution of students as regards **educational level**. It should be observed that the levels of the different countries are not identical. Above all, the British levels differ from the Swedish and the Norwegian ones (see the explanations given under the table).

When comparing different courses we find a pattern which partly resembles that of the age distribution. The students of YES 1 have by far the lowest level of previous education (in the Swedish versions: 54.5 per cent only elementary school; in the Norwegian version: 62.6 per cent 7 or 9 years' elementary school). The group of participants in Advanced Economics is fairly homogeneous: nearly 70 per cent have attained the O level of the General Certificate of Education. The educational level of the Psychology of Management students is comparatively high – about 35 per cent belong to the upper secondary school and university levels; the dispersion of students on various levels is however considerable in this course: almost 27 per cent have no formal education above elementary school.

In the same course, Psychology of Management, the distribution as regards educational level diverges from what could be expected. Above all, the 2×8 group differs from the other ones.

As concerns experiments according to design 3, the two Swedish versions of YES 1 are different with regard to educational level. Students at the comprehensive school level are over-represented in the computer-assisted version, while the reverse is true about students having completed a vocational school or the like. No difference was found between the two versions of Psychology, General Course, in this respect.

In Physics, Elementary Course more than half of the students who returned the enrolment questionnaire had **previously taken a correspondence course**; see *appendix 6, table 22*. As a contrast, nearly 85 per cent of the participants in Advanced Economics were beginners with regard to study form. In the remaining courses about 40 per cent of the students had previous experience of correspondence study.

In two courses, the distributions diverge from the expected ones: in Advanced Economics and Psychology of Management. As regards Psychology of Management, the 4×8 group differs most clearly from the other groups by having an over-representation of students who have previously taken a correspondence course.

No differences were found between the design 3 experimental versions of YES 1 and Psychology, General Course.

According to *appendix 6, table 23*, in all fully 21 per cent of the students stated that they were **taking another course by correspondence** at the same time as they studied the experiment course. This was comparatively common among students of Physics, Elementary Course (appr. 42 per cent), while the proportion of such participants is small in YES 1 (very small – around 10 per cent – in the Norwegian version of this course).

Also in this variable, a divergence from the expected distribution of answers was found as regards Psychology of Management.

In the analysis of experimental versions according to design 3 (YES 1, Psychology, General Course) no significant differences emerged.

In addition to those background variables which have been presented in *appendix 6, tables 19–23*, the distributions concerning **marital status**, **study situation**, and **occupation** were also studied. In one case only could a significant divergence from the expected distribution be established: in Psychology, General Course, the 4 submission group was under-represented as concerns one of the occupational categories (work with written symbols; cf. FLINCK, 1978, p. 40). No differences were found when comparing the different versions of YES 1 (Swedish versions) and Psychology, General Course.

In order to study the distributions with regard to the **motives for studying**, I constructed composite variables out of those study motive variables which had fallen out in the factor analysis. All the sum variables were then transformed into a common scale. This corresponds to the scale of the original variables and runs from 1.0 (very great importance) to 4.0 (very slight importance). The distributions were tested by means of analyses of variance. The results are shown in *appendix 6, table 24*.

As expected, those motives which are here called *"social motivation"* (cf. factor I, FLINCK, 1978, p. 42) were of very slight importance. *Extrinsic motivation* – orientation towards goals like getting on in one's career or obtaining a better competence for one's job (cf. factor II, *ibidem*) – was of greater significance. This is most obvious in Advanced Economics but it is clearly noticeable also in Physics, Elementary Course, and, to some extent, in Psychology of Management (which is a vocationally directed course!). *Intrinsic motivation* – interest in the subject, pursuit of knowledge for its own sake, etc. (cf. factor III, *ibidem*) – was apparently of the greatest importance in all courses and course versions but Advanced Economics and Physics, Elementary Course. A particularly strong intrinsic motivation was reported from students of Psychology, General Course.

Significant divergences from expected distributions were observed in two of the 24 distributions related to experiments according to designs 1 and 2. In YES 1 (H, traditional), the 2 submissions group has a higher value on the intrinsic motivation variable than the other two groups. In Psychology, General Course (computer-assisted), the 8 submissions group shows a lower value than the remaining groups with regard to the extrinsic motivation variable.

In addition, in one case out of six a difference was found between computer-assisted and traditional course versions according to design 3. This refers to YES 1; in this course the students of the computer-assisted version appear to have a slightly higher degree of social motivation than the students of the traditional version.

The distributions with regard to **motives for choosing correspondence education** are presented in *appendix 6, table 25*. Composite variables were constructed and transformed in a way parallel to the study motive variables, and analyses of variance were used for testing the distributions.

The motive type A, *supposed advantages of the study form* (cf. section 4.6.1, factor A), was of comparatively great importance according to the students of all the courses/course versions, especially in YES 1 and Psychology, General Course. *External conditions* (motive type B) of those kinds where the employer or the geographical circumstances preclude the choice of another study form (cf. 4.6.1, factor B) were apparently of very slight importance. *Difficulties to combine one's work with another study form* (motive type C; cf. 4.6.1, factor C) seem to have been of some importance but do not stand out as a dominating motive for choosing correspondence education.

Only one significant divergence from expected distributions was observed as concerns experiments according to designs 1 and 2: in Physics, Elementary Course, with regard to the motive type C variable.

However, in three cases out of six, differences were also found between computer-assisted and traditional versions of YES 1 (Hermods) and Psychology, General Course. Two of these differences refer to YES 1: On variable B, the computer-assisted version has a lower value than the traditional one; the same applies to variable C. In Psychology, General Course, the reverse is true as regards variable C: here, the difficulties to combine one's work with another study form is apparently more deeply felt among students in the traditional version than in the computer-assisted one.

In *table 26*, a survey of the randomization analysis is provided. In all, 140 significance tests were performed. Only 16 significant group differences were found. This is very near to a random outcome ($\alpha = 0.10$). As concerns experiments according to *designs 1 and 2*, only one course/course version – Psychology of Management – shows distributions diverging from those expected in three cases. In relation to one of the *design 3* experiments, YES 1, a noticeable number of divergences was also found. Here, the experimental groups, belonging to two subsequent student cohorts, differ significantly from each other on four enrolment questionnaire variables.

The relevance of these initial differences between experimental groups will be discussed later, in connection with the presentation of the experimental results (chapters 6–8).

4.7.3 How representative are the students?

In the previous section, the students of the experiment courses were described by means of their answers to questions in the enrolment questionnaire. We can now compare them with the general picture of the correspondence school student which was outlined in section 2.3.

Advanced Economics apparently attracts mainly participants who may be described as traditional correspondence students: men between 21 and 30 years of age at a moderately high educational level; the principal purpose of their studies is to attain an extrinsic goal (to get on in their jobs, to get a better job, etc.).

Table 26. A survey of the randomization analysis. Significant divergences: + = on the 10 per cent level, * = on the 5 per cent level

Experiment	Enrolment questionnaire variable													
	1	2	3	4	5	6	7	8	9:1	9:2	9:3	10:A	10:B	10:C
According to design 1														
YES 1 (H, comp.-ass.)														
YES 1 (H, traditional)											+			
Psychology, G.C. (comp.-ass.)										+				
Psychology, G.C. (traditional)					+									
Physics, E.C.	+												+	
Advanced Economics	*[1]						+							
According to design 2														
YES 1 (NKS)	+[1]													
Psychology of Management						+	*	*						
According to design 3														
YES 1 (H)						+			*				+	+
Psychology, G.C.														*

Enrolment questionnaire variables

1 – Sex
2 – Age
3 – Marital status
4 – Study situation
5 – Occupation
6 – Educational level
7 – Previous correspondence study
8 – Parallel correspondence study

9:1 – "Social motivation"
9:2 – Extrinsic motivation
9:3 – Intrinsic motivation
10:A – Supposed advantages of the study form
10:B – External conditions (employer or geographical circumstances)
10:C – Difficulties to combine one's work with another study form

1) No significant differences, if students who did not answer the enrolment questionnaire are included

On the whole, the participants of *Physics, Elementary Course* could also be described according to this pattern.

About the same applies to *Psychology of Management*. In this course, however, the average educational level is somewhat higher than in the previous two courses, and the students are (contrary to what might be expected) less decidedly directed towards extrinsic goals.

The students of *Psychology, General Course* diverge from the general pattern in at least two respects: no less than two thirds are women, and their motivation for studying is markedly knowledge-orientated, i.e., directed towards intrinsic goals.

Also the *YES 1* students diverge, to a considerable extent, from the traditional pattern. Above all, a great majority of them are above 30 years of age and have a low level of formal education. In addition, the participants are evenly distributed with regard to sex, and their motivation for studying is mainly knowledge-orientated.

5 Loss of data

In the preceding chapter, one major type of data loss was described and analysed: non-return of enrolment questionnaires (4.7.1). In this chapter, a complete survey of the data loss will be provided, with an analysis mainly concentrating on possible initial differences between completers and non-completers. Finally, certain information gathered by means of the dropout questionnaire will be reported.

5.1 Total dropout from the experimental groups

As previously indicated (4.7), 55 individuals – i.e. 3.1 per cent of the experimental groups – dropped out altogether. The causes are varying. Most of the students returned the study material, cancelling their application for the course. Some changed from computer-assisted to traditional tuition, or from pure correspondence education to a form of correspondence study combined with face-to-face sessions. A few turned out to be too young (from 16 down to 12 years of age). See *appendix 6, table 27.*

Since the magnitude of this complete loss of data is very slight, it could probably not affect the experimental results to any appreciable extent.

5.2 Partial loss of data

5.2.1 Description

The numbers of completers and non-completers are given in *table 28*, with regard to each of the courses/course versions and experimental groups. This table also provides a survey of all other kinds of available data (except those obtained by means of the "non-answerer questionnaire", cf. 4.6.1). As concerns the data collected by means of questionnaires, "available data" refers to the numbers of *questionnaires returned*. However, in addition to the loss of data caused by the non-return of questionnaires and reported in table 28, there is some data loss due to the lack of answers to certain items in a number of returned questionnaires.

Certain kinds of data, collected by means of the special registers of students (*table 14*, 4.6.1) and related to the variables start and gross study time, are not explicitly reported in table 28. They are, however, easily deducible from other data shown in the table. Concerning *start*, data are available from all the 1750 experimental subjects, whereas data on *gross study time*, with very few exceptions (mainly concerning YES 1, H, traditional–cf. below), exist with regard to all the completers.

Only with reference to the two study perseverance variables, start and completion, there is no partial loss of data. Mainly due to the substantial number of non-completers, the data loss regarding the remaining variables is, in most cases, considerable.

It is well known that the proportion of non-completers is often great in correspondence education – as in most other kinds of non-compulsory part-time adult education (2.8.1). An appreciable number of non-completers was therefore expected.

Table 28. Completers and non-completers, with a survey of other data available, distributed on completers and non-completers

Course/course version and experimental group	Com-pl.	Non-com-pl.	Σ	Other data available: Completers 1	2	3	4	Non-compl. 1	5
YES 1 (H, comp.-ass.)	*70*	*151*	*221*	*70*	*66*	*64*	*49*	*128*	*65*
8 submissions	27	52	79	27	25	24	19	45	23
4 »	26	51	77	26	24	24	18	47	23
2 »	17	48	65	17	17	16	12	36	19
YES 1 (H, traditional)	*51*	*159*	*210*	*49*	*32*	*31*	*15*	*131*	*86*
8 submissions	8	50	58	8	5	5	2	37	25
4 »	19	66	85	18	13	12	5	57	38
2 »	24	43	67	23	14	14	8	37	23
Psychology, G.C. (comp.-ass.)	*70*	*144*	*214*	*69*	*70*	*67*	*46*	*130*	*80*
8 submissions	24	47	71	24	24	24	17	41	27
4 »	20	54	74	20	20	20	11	48	28
2 »	26	43	69	25	26	23	18	41	25
Psychology, G.C. (traditional)	*40*	*162*	*202*	*40*	*38*	*37*	*25*	*148*	*89*
8 submissions	15	50	65	15	15	15	8	47	23
4 »	10	51	61	10	9	8	6	46	34
2 »	15	61	76	15	14	14	11	55	32
Physics, E.C.	*84*	*109*	*193*	*80*	*77*	*77*	*59*	*81*	*39*
8 submissions	29	37	66	29	28	28	22	31	15
4 »	26	38	64	23	24	24	16	22	11
2 »	29	34	63	28	25	25	21	28	13
Advanced Economics	*27*	*294*	*321*	*27*	*24*	*16*	*20*	*264*	*110*
12 submissions	10	104	114	10	9	7	8	90	35
6 »	14	88	102	14	13	8	12	82	37
3 »	3	102	105	3	2	1		92	38
YES 1 (NKS)	*101*	*148*	*249*	*99*	*91*	*92*	*60*	*128*	*71*
8×12 ass.questions	24	36	60	24	24	24	14	31	18
8×6 »	22	41	63	22	20	20	13	38	19
4×12 »	32	31	63	31	28	29	19	24	12
4×6 »	23	40	63	22	19	19	14	35	22
Psychology of M.	*92*	*48*	*140*	*90*	*87*	*89*	*82*	*41*	*19*
4×16 ass.questions	26	12	38	25	24	25	24	12	5
4×8 »	24	10	34	24	24	24	23	9	5
2×16 »	20	11	31	20	19	19	21	10	4
2×8 »	22	15	37	21	20	21	14	10	5
Σ	*535*	*1215*	*1750*	*524*	*485*	*473*	*356*	*1051*	*559*

Available data: 1 – Enrolment questionnaire
2 – Final questionnaire
3 – Final test
4 – Net study time
5 – Dropout questionnaire

Still, considering the moderate or short extent of all the courses, the proportion of study dropouts is surprisingly great in certain cases. This applies, in particular, to

Advanced Economics (only 8.4 per cent completers), but also to the traditional version of Psychology, General Course (19.8 per cent completers). Only Psychology of Management has a majority of completers (65.7 per cent).

As has previously been shown (cf. table 17), most of the completers returned the *enrolment questionnaire*; merely 2.1 per cent did not do so. The loss of intake data from the group of non-completers is considerably greater (13.5 per cent).

With regard to final questionnaire, final test, and net study time, the available data refer only to completers – for obvious reasons.

Most of those students who completed their course also returned the *final questionnaire* (90.7 per cent). However, due to an administrative oversight on the part of the school, the traditional Swedish version of YES 1 diverges from this pattern (only 63.0 per cent return).

About the same applies to the *final test*. Here, the average loss of data is 11.6 per cent – thus only slightly more than regarding the final questionnaire. Also in this case YES 1 (H, traditional) diverges in the negative direction, on the same account.

In spite of reminders, complete data as concerns *net study time* could be secured from only two thirds of the completers (66.6 per cent), with a still greater loss of data with regard to YES 1 (H, traditional).

As might be expected, a considerably minor proportion of students responded to the *dropout questionnaire* (46 per cent) than to the final questionnaire. The comparatively best returns were obtained from non-completers in Psychology, General Course (both versions) and YES 1 (H, traditional) – all about 55 per cent – whereas no more than about 36 and 37 per cent, respectively, of the non-completers in Physics, Elementary Course, and Advanced Economics returned this questionnaire.

To sum up, we see that

- data regarding start and completion are available for all subjects of the experiments
- the proportion of completers is varying between courses and even between versions but must be characterized as small or fairly small in all the courses except Psychology of Management
- as concerns the completers, the loss of data is slight with regard to all the variables except net study time and with regard to all the courses/course versions except the traditional Swedish version of YES 1
- the loss of data concerning the non-completers is more serious; this applies in particular to the dropout questionnaire.

5.2.2 Analysis

The low frequency of completers in most of the courses/course versions makes comparisons between experimental groups difficult with reference to all the outcome variables except start and completion. In one case – Advanced Economics – the only outcome comparison that can be made concerns study perseverance (i.e., start and completion). As to the remaining courses/course versions, I will begin the analysis of the data loss by asking *whether the completers, as a group, are different from the non-completers*. For the statistical tests, a significance level of $\alpha = 0.10$ would appear appropriate.

Table 29 shows that completers and non-completers are initially different with regard to previous correspondence study in four courses/course versions used for experiments according to designs 1 and 2. More completers than non-completers have previously taken a correspondence course. For two of these courses/course versions (YES 1, H, computer-assisted, and YES 1, NKS) additional differences in a number of other variables were found. Also in the two experiments according to design 3, completers and non-completers differ as concerns a few intake variables, among them previous experience of correspondence study.

Table 29. Analysis of the comparability between completers and non-completers with regard to enrolment questionnaire variables. Significant differences: + = on the 10 per cent level, * = on the 5 per cent level, ** = on the 1 per cent level

Experiment	Enrolment questionnaire variable													
	1	2	3	4	5	6	7	8	9:1	9:2	9:3	10:A	10:B	10:C
According to design 1														
YES 1 (H, comp.-ass.)							+	**		*			*	*
YES 1 (H, traditional)	+													
Psychology, G.C. (comp.-ass.)							*							
Psychology, G.C. (traditional)														
Physics, E.C.		+												
According to design 2														
YES 1 (NKS)				+			+				+			
Psychology of Management							**							
According to design 3														
YES 1 (H)							*	*						
Psychology, G.C.		*					**			*				

Enrolment questionnaire variables

1 – Sex
2 – Age
3 – Marital status
4 – Study situation
5 – Occupation
6 – Educational level
7 – Previous correspondence study
8 – Parallel correspondence study

9:1 – "Social motivation"
9:2 – Extrinsic motivation
9:3 – Intrinsic motivation
10:A – Supposed advantages of the study form
10:B – External conditions (employer or geographical circumstances)
10:C – Difficulties to combine one's work with another study form

The differences found will be taken into consideration in connection with the interpretation of the experimental results, particularly with regard to the variable previous correspondence study.

As has been shown in table 28, some completers did not return the final questionnaire, and a slightly higher proportion did not take the final test. Analyses of these data losses are provided in *appendix 6, tables 30 and 31*. (Since final questionnaire and final test data from Advanced Economics will not be used, this course is not included here.) In all the courses/course versions except YES 1 (H, traditional), the loss of data is throughout comparatively small and without marked biases. It will thus, most probably, not affect the experimental outcome in these courses/course versions.

From table 28 it is obvious that the data loss in the Swedish traditional version of YES 1 is considerable, as concerns the final questionnaire and the final test. Therefore, separate analyses were made for this version with respect to possible differential data losses in the experimental groups (*appendix 6, tables 32 and 33*). It appears that the students representing the data loss of the two-submissions group diverge, to some extent, from this group as a whole. This applies to age and educational level as well as to previous experience of correspondence education (cf. tables 20–22). The loss of data might therefore bias the experimental results in YES 1, (H, traditional), as regards the final questionnaire variables and the final test. This possibility will be taken into account when interpreting the experimental results.

The loss of data concerning *net study time* is (with the exception of Psychology of Management) so large that the results must be intrepreted with considerable care. No comparisons between experimental groups will be made with reference to this variable.

The same applies to the *dropout questionnaire*. Therefore, the accounts of data from this questionnaire which will be provided in the following section and in later chapters, are not intended to be representative of the whole non-completers group(s). They just refer to those among the non-completers who actually returned the questionnaire and answered the questions. Consequently, no comparisons between experimental groups will be made using data from the dropout questionnaire.

5.3 Some data from the dropout questionnaire

The first part of the dropout questionnaire contains a few questions on how the students regard their study situation and why they stopped submitting assignments (or never started doing so). Before reporting the responses to these questions, I would like to repeat that only 559 out of 1215 non-completers returned the dropout questionnaire (cf. section 5.2.1, table 28). Furthermore, the items of this questionnaire had to be gradually differentiated with regard to what experience of the course and the correspondence studies the non-completers could have gained. In addition, there is a considerable loss of data on certain single items in this questionnaire. From all this follows—as was already stated in the previous section—that we cannot know to what extent the answers of non-completers are representative of the whole group(s) of non-completers.

5.3.1 Study status

The first question in the dropout questionnaire was worded: "Are you at the present time still studying your course?" See *table 34*. By combining the response alternatives 4 and 6 we find that only 13.6 per cent of the 559 non-completers who returned the questionnaire appear to regard themselves as dropouts. All the others state either that they are actually still studying—or have even completed their course—or that they

are to resume their studies/are to start studying later on. Similar results were reported by FLINCK (1978, p. 56). (Since the variations between courses/course versions are generally small, only the totals are shown in this table and in most of the remaining tables of this section.)

Table 34. Study status, according to the respondents of the dropout questionnaire

Study status	f	%
1 Yes, I am still studying the course	127	22.7
2 No, I have completed the whole course	24	4.3
3 No, I have stopped studying temporarily, and will resume again later	246	44.0
4 No, I have stopped studying without completing the course, and I do *not* expect to resume my studies again	57	10.2
5 No, I have not started studying the course yet, but I intend to do so later	86	15.4
6 No, I have not started studying the course, and I do *not* intend to do so	19	3.4
Σ	559	100.0

Many of these students probably viewed their own study status too optimistically. No doubt, some of them went on submitting assignments after they had returned the dropout questionnaire – a few even completed their course (cf. 4.6.2) – but the great majority did not do so, at least not during the data collection period.

Tables 35 and *36* show how much of the course material the 559 students had worked through and how many of the assignments they had submitted – all according to themselves.

Table 35. Answers to a question in the dropout questionnaire: "About how much of the course material have you worked through, at least fairly thoroughly?"

Alternative		f	%
1 Hardly anything at all	(0 %)	190	34.0
2 One quarter	(25 %)	194	34.7
3 One half	(50 %)	96	17.2
4 Three quarters	(75 %)	61	10.9
5 All the material	(100 %)	18	3.2
Σ		559	100.0

Table 36. Answers to a question in the dropout questionnaire: "About how many of the test papers/exercise papers in this course have you sent to the correspondence school for marking?"

Alternative	f	%
1 None	309	55.3
2 Some	121	21.7
3 One half	79	14.1
4 Most	37	6.6
5 All	13	2.3
Σ	559	100.0

A comparison between the figures shown in tables 35 and 36 might be interpreted as giving some support to an idea maintained by certain correspondence educators: that submission of assignments is not directly indicative of how far a student has reached in his or her studies. According to the tables, some students have apparently not sent in solutions in proportion to how much of the course material they have worked through. However, the difference is by no means dramatic. It might therefore equally well be concluded that the submission of assignments is a fairly good criterion of the participants' study activity.

5.3.2 Causes of/reasons for discontinuation of the studies

The differentiation of the remaining parts of the dropout questionnaire was based on the students' answers according to tables 34–36:

- Students who chose one of the alternatives 5 and 6 according to table 34 were not expected to be able to answer any of the remaining questions (except those reported in tables 35 and 36)
- Students who chose alternative 1 according to table 35 were not asked to answer any of those questions about the course and the studies in the dropout questionnaire which are identical with (or parallel to) questions in the final questionnaire
- Students who chose alternative 1 according to table 36 were not asked to answer those questions about the course and the studies which refer specifically to the two-way communication.

Table 37 provides a survey of the students' attitudes to a number of statements concerning possible causes of/reasons for discontinuing a course – or making a temporary break in one's studies. (In all, 454 of those non-completers who returned the questionnaire were expected to be able to state their attitudes to these statements. Thus, there is an additional loss of data as regards these statements, varying from 15 to 33 students.)

The response pattern is very similar to the one reported by FLINCK (1978, p. 58). Only a minority of those non-completers who stated their attitudes thought that they had had any appreciable difficulties in starting their studies (24.1 per cent), that the possible dullness (24.4 per cent) or difficulty (29.1 per cent) of the course material had delayed their studies, or that troubles as to the assignments for submission had seriously interfered with their study rate (25.4 per cent). Instead, other work (73.5 per cent) and lack of time (65 per cent) were stated as the main causes of not making any progress in one's course.

However, two of the courses diverge from the general pattern with regard to some of the course-related variables (1, 2, 4, 6): Psychology, General Course, and Advanced Economics. In *Psychology, General Course*

- 40.7 per cent (computer-assisted version) and 44.9 per cent (traditional version) stated that the course material had been difficult to understand
- 39.7 per cent (computer-assisted version) and 50.0 per cent (traditional version) maintained that the assignments for submission had been troublesome.

As concerns *Advanced Economics*,

- 42.0 per cent stated that the course material had been difficult to understand
- 45.9 per cent asserted that the course material had seemed dull.

These deviations from the general pattern according to table 37 indicate a lack of adjustment between course design and parts of the student groups and may – partly, at least – explain the unusually low degree of study perseveration among the students of Psychology, General Course and Advanced Economics.

Table 37. Statements about difficulties making it hard to get forward in the course (dropout questionnaire)

Statement	Answers					
	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree	Σ
1 I found it very hard to start at all	40	66	54	162	117	439
2 I found it very hard to study when the course material was difficult to understand	46	81	73	142	94	436
3 I found it very hard to study when other work hindered me	154	168	48	44	24	438
4 I found it very hard to study when the course material seemed dull	30	75	80	133	113	431
5 I found it very hard to study when I felt I had not enough time	132	150	50	64	38	434
6 I found it very hard to work out the answers to the questions in the test papers/exercise papers	39	68	110	121	83	421

5.3.3 Possible goal accomplishment in spite of non-completion of the course

Some students may be contented with what they have obtained from a course, although they have not completed it (cf. 2.8.1). Are there any such participants among those 369 who returned the dropout questionnaire and stated that they had worked through at least part of the course material? See *table 38.*

Table 38. Answers to the question: "Do you think you have already got out of the course what you wanted to get out of it?" (dropout questionnaire)

Course/course version	Yes	No	Σ
YES 1 (H, comp.-ass.)	11	22	33
YES 1 (H, traditional)	23	24	47
Psychology, G.C. (comp.-ass.)	9	35	44
Psychology, G.C. (traditional)	8	30	38
Physics, E.C.	11	15	26
YES 1 (NKS)	28	14	42
Psychology of Management	2	6	8
Advanced Economics	22	67	89
Σ	114	213	327

As is shown in the table, 114 students – i.e., about one third of those who answered the question – actually thought that they had already gained what they wanted from the course. A majority of these students had worked through half of their course, or more.

There are, however, considerable variations between different courses/course versions according to table 38. Also in this respect, Psychology, General Course, and Advanced Economics apparently diverge to some extent by having smaller proportions of "satisfied non-completers" than the majority of the remaining courses/course versions. The reverse applies to the Norwegian version of YES 1.

Part III: Results and discussion

6 Results of experiments according to design 1

6.1 Introduction

The experiments that were carried through according to design 1 (4.5.1) refer to problem area 1, *the submission density of correspondence courses*. In the six courses/course versions mentioned below, the submission density was varied systematically and a number of outcome variables were observed:

YES 1 (Hermods, computer-assisted two-way communication)
YES 1 (Hermods, traditional two-way communication)
Psychology, General Course (Hermods, computer-assisted two-way communication)
Psychology, General Course (Hermods, traditional two-way communication)
Physics, Elementary Course (Hermods, computer-assisted two-way communication)
Advanced Economics (the RRC, traditional two-way communication).

In this chapter, the results will be presented in the following way. The outcome as concerns *study perseverance* (start and completion) will be shown in section 6.2. The following section (6.3) deals with the *attitude variables*, using data from the final questionnaire, in the first place; some comparative data from the dropout questionnaire will also be taken into account, however. The *final test* results will be presented in section 6.4 and the outcome as regards *study time* (gross study time and net study time) in section 6.5.

In all the cases where it was regarded meaningful, considering the loss of data, differences between experimental groups were tested by means of χ^2 (applies to the study perseverance variables) or analysis of variance (the remaining outcome variables). In order optimally to balance the risk of type II errors against the risk of type I errors, a significance level of $\alpha = 0.05$ was chosen. When significant differences were found, the strength of the relationships were also computed, by means of Cramérs index (applies to χ^2 tests; symbolized r_C) or η^2 (referring to the analyses of variance).

Since the number of course completers is extremely low in Advanced Economics –27 students (out of 321)–only results related to the study perseverance variables will be shown as far as this course is concerned.

Finally, in section 6.6, the outcome will be discussed. In the first part of this discussion (6.6.1), I will provide a survey showing how certain intake variables are related to some of the outcome variables. On the basis of this survey, some potential sources of error will be analysed (cf. table 26, section 4.7.2, as well as tables 29 and 32–33, section 5.2.2).

6.2 Study perseverance variables

6.2.1 Start

Table 39 shows the proportion of starters in all the experimental groups of the six courses/course versions. (*Starter* = a student who has submitted at least the assignments of the first study unit for correction and comments; cf. 1.6.)

We see that the starters outweigh the non-starters only slightly (51.6 per cent against 48.4 per cent). Physics, E. C. has the largest proportion of starters (65.3

Table 39. Results of experiments according to design 1: Start. (n.s. = not significant; n.s. statements, p values, and r_C values refer to comparisons between experimental groups)

Course/course version and experimental group	Starters	Non-starters	Σ	
YES 1 (H, comp.-ass.)	*134*	*87*	*221*	$p < 0.001$
8 submissions	54	25	79	$r_C = 0.27$
4 »	54	23	77	
2 »	26	39	65	
YES 1 (H, traditional)	*105*	*105*	*210*	
8 submissions	27	31	58	n.s.
4 »	47	38	85	
2 »	31	36	67	
Psychology, G.C. (comp.-ass.)	*126*	*88*	*214*	$0.02 < p < 0.05$
8 submissions	51	20	71	$r_C = 0.19$
4 »	40	34	74	
2 »	35	34	69	
Psychology, G.C. (traditional)	*84*	*118*	*202*	$0.001 < p < 0.01$
8 submissions	38	27	65	$r_C = 0.24$
4 »	23	38	61	
2 »	23	53	76	
Physics, E.C.	*126*	*67*	*193*	$p < 0.001$
8 submissions	58	8	66	$r_C = 0.35$
4 »	36	28	64	
2 »	32	31	63	
Advanced Economics	*127*	*194*	*321*	$p < 0.001$
8 submissions	56	58	114	$r_C = 0.24$
4 »	47	55	102	
2 »	24	81	105	
Σ	*702*	*659*	*1361*	

per cent), Advanced Economics the least (39.6 per cent). On the whole, the proportion of non-starters is markedly large.

In five of the six experiments, significant differences between the experimental groups were found. The only exception is the traditional Swedish version of YES 1. In all the five cases, the differences take the same direction: A higher degree of submission density is related to a greater proportion of starters, whereas a lower degree of submission density is connected with a greater proportion of non-starters. In most cases, the relationships are moderately strong (from $r_C = 0.24$ to $r_C = 0.35$). For instance, in YES 1 (H, computer-assisted) 68.4 per cent of the students in the 8 submissions group started submitting assignments, as contrasted to 40.0 per cent in the 2 submissions group. The corresponding percentages regarding Physics, E. C. are 87.9 (8 submissions) and 50.8 (2 submissions).

A highly probable conclusion would be that, in most of the courses/course versions, the experimental variation affected the inclination to start in such a way that higher submission density entailed a stronger inclination to start.

6.2.2 Completion

Also the proportion of completers is markedly small in those courses/course versions which were studied according to experimental design 1. See *table 40*.

Only Physics, Elementary Course attained more than 40 per cent completers (43.5 per cent). Less than 20 per cent was observed in the traditional version of Psychology, General Course (19.8 per cent) and Advanced Enonomics (8.4 per cent).

Table 40. Results of experiments according to design 1: Completion. (n.s. statements, p values, and r_C values refer to comparisons between experimental groups)

Course/course version and experimental group	Completers	Dropouts	Σ	
YES 1 (H, comp.-ass.)	*70*	*151*	*221*	
8 submissions	27	52	79	n.s.
4 »	26	51	77	
2 »	17	48	65	
YES 1 (H, traditional)	*51*	*159*	*210*	$0.01 < p < 0.02$
8 submissions	8	50	58	$r_C = 0.20$
4 »	19	66	85	
2 »	24	43	67	
Psychology, G.C. (comp.-ass.)	*70*	*144*	*214*	
8 submissions	24	47	71	n.s.
4 »	20	54	74	
2 »	26	43	69	
Psychology, G.C. (traditional)	*40*	*162*	*202*	
8 submissions	15	50	65	n.s.
4 »	10	51	61	
2 »	15	61	76	
Physics, E.C.	*84*	*109*	*193*	
8 submissions	29	37	66	n.s.
4 »	26	38	64	
2 »	29	34	63	
Advanced Economics	*27*	*294*	*321*	$0.01 < p < 0.02$
12 submissions	10	104	114	$r_C = 0.16$
6 »	14	88	102	
3 »	3	102	105	
Σ	*342*	*1019*	*1361*	

When the experimental groups were compared, two significant differences could be established, in YES 1 (H, traditional) and Advanced Economics. The divergences take different directions, however. In YES 1 (H, traditional) the two-submissions group—thus, the one with the lowest submission density—has the *largest* proportion of completers. In Advanced Economics, the situation is reverse. Here, the group with the lowest submission density—the 3 submissions group—has the *least* proportion of completers (only 3 out of 105 students). Evidently, this result is difficult to interpret.

6.3 Attitude variables

6.3.1 Attitudes to the course and the teaching

The variable *attitude to the course and the teaching* is constructed as a composite variable including 9 sub-variables. These sub-variables represent answers to questions in the *final questionnaire* concerning the attitude to the subject, the course material, the assignments for submission, the scrutiny of submitted assignments, the course as a whole, and correspondence education in general (see FLINCK, 1978, p. 138–140, tables 5.3–5.11).

The minimum value of this variable is 9 (= an extremely positive attitude), and its maximum value 43 (= an extremely negative attitude). A completely neutral attitude would be represented by the value 26.

In *table 41* the outcome is summarized with regard to the experimental groups of all the courses/course versions, except Advanced Economics (cf. 6.1).

The attitude is positive throughout among the completers, without appreciable variations between courses/course versions. Nor were any significant differences between experimental groups established.

As concerns the corresponding questions in the *dropout questionnaire*, no composite variables were computed, considering the magnitude of the data loss with regard to this questionnaire (cf. table 28, section 5.2.1). For the same reason, no comparisons were made between different groups of dropouts (cf. 5.2.2). Still,

Table 41. Results of experiments according to design 1: Attitude to the course and the teaching, completers. (n.s. statements refer to comparisons between experimental groups)

Course/course version and experimental group	f	M	sd	
YES 1 (H, comp.-ass.)	*66*	*19.86*	*3.77*	
8 submissions	25	19.48	3.07	n.s.
4 »	24	19.21	3.36	
2 »	17	21.35	4.92	
YES 1 (H, traditional)	*31*	*19.90*	*3.42*	
8 submissions	5	18.20	3.42	n.s.
4 »	12	19.17	2.33	
2 »	14	21.14	3.94	
Psychology, G.C. (comp.-ass.)	*69*	*20.62*	*2.61*	
8 submissions	23	19.65	2.77	n.s.
4 »	20	21.40	2.85	
2 »	26	20.88	2.05	
Psychology, G.C. (traditional)	*37*	*21.11*	*3.70*	
8 submissions	14	21.00	4.31	n.s.
4 »	9	21.33	3.50	
2 »	14	21.07	3.41	
Physics, E.C.	*77*	*20.46*	*3.80*	
8 submissions	28	19.86	3.28	n.s.
4 »	24	20.56	3.83	
2 »	25	21.04	4.33	

some data from the dropout questionnaire will be reported in this section. It must be emphasized that these data refer only to those non-completers who not only returned the dropout questionnaire but also had started their studying (in some sense). (On the differentiation of the dropout questionnaire, see section 5.3.2.) The aim of reporting such data is merely to provide an idea of *these* non-completers' attitudes towards some of the questions (or statements) that were responded to by the completers in the final questionnaire.

In order to illustrate the non-completers' attitudes to the course and the teaching I have chosen two of the nine sub-variables making up the variable; one table shows how they and the completers regard their course, and the other provides an idea of how they view correspondence education in general. See *appendix 6, tables 42* and *43*.

The questionnaire item related to *table 42* is worded: "When I started the course I had certain expectations of it. I now think the course has . . ." (1 = "surpassed by far my expectations", 5 = "not come up at all to my expectations").

As might be presupposed, the non-completers adopt a somewhat more negative attitude than the completers. However, the typical answer of both categories is "the course has come up to my expectations" (= value 3). 73.8 per cent of the completers and 68.3 of the non-completers in question gave this answer.

In a corresponding way, *table 43* shows how completers and non-completers responded to the statement "To study by means of a correspondence course was for me . . ." (1 = "a very good way of studying", 5 = "a very poor way of studying").

Here, the attitudes of the completers are markedly favourable. 89 per cent state that for them correspondence education is a good study form (48.6 per cent "very good"). The most positive attitude appears to prevail among the completers of Psychology, General Course, whereas non-completers of the same course adopt a more moderate position. Nevertheless, on the whole there are fairly positive attitudes also among the non-completers who responded to this questionnaire item (68.6 per cent positive, out of whom 25.3 per cent stating "a very good way of studying".

6.3.2 Attitudes to the assignments for submission

The variable *attitude to the assignments for submission* is composed of 11 sub-variables. These sub-variables represent responses to the following statements concerning the value of the assignments for submission:

- They made my study work more pleasant and stimulating
- They helped me to divide up my study work in portions of about the right size
- They made me feel I had contact with the correspondence school
- They helped me to distinguish what was important in the course
- They made me study more actively than I would have done otherwise
- They helped me to survey the preceding study units and to grasp the whole
- They were of great help to me when I revised the course or part of it
- They helped me to apply what I had learned
- They helped me to correct what I had learned wrongly or incompletely (thanks to the tutor's marking and commenting on my written work)
- They provided me with opportunities to experience success and to get encouragement during my study work (thanks to the tutor's comments)
- They were of importance because they made it possible for me to get a certificate on the course.

(Largely, these statements correspond to the statements of a similar question in a questionnaire to representatives of European correspondence schools; see table 2, section 2.5.1.)

The students were asked to agree or disagree with each of these statements according to a five degree scale. Thus, the minimum value of the variable is 11 (= an extremely positive attitude) and its maximum value 55 (= an extremely negative attitude). A completely neutral attitude would be represented by the value 33.

Table 44 shows the result with regard to this variable. It indicates clearly that the completers regard the assignments for submission as a valuable element in all the five courses/course versions. This outcome is in accordance with what was found by GRAHM (1969); cf. tables 6 and (particularly) 7, section 2.5.8.

Table 44. Results of experiments according to design 1: Attitude to the assignments for submission, completers. (n.s. statements, p value and η^2 value refer to experimental groups)

Course/course version and experimental group	f	M	sd	
YES I (H, comp.-ass.)	*62*	*20.68*	*5.78*	
8 submissions	24	20.54	5.02	n.s.
4 »	21	19.67	7.05	
2 »	17	22.12	5.05	
YES I (H, traditional)	*29*	*21.76*	*6.62*	
8 submissions	5	19.60	8.71	n.s.
4 »	11	22.27	5.39	
2 »	13	22.15	7.09	
Psychology, G.C. (comp.-ass.)	*69*	*20.39*	*7.25*	
8 submissions	24	20.63	9.33	n.s.
4 »	19	20.47	6.54	
2 »	26	20.12	5.67	
Psychology, G.C. (traditional)	*36*	*20.67*	*5.48*	
8 submissions	13	18.85	4.98	n.s.
4 »	9	20.22	5.59	
2 »	14	22.64	5.58	
Physics, E.C.	*75*	*21.27*	*6.48*	$0.001 < p < 0.01$
8 submissions	26	18.62	4.76	$\eta^2 = 0.12$
4 »	24	21.21	6.68	
2 »	25	24.08	6.87	

The statistical tests prove a significant difference between experimental groups in one case, Physics, Elementary Course. Here, the high submission density group demonstrates the most favourable attitude, whereas the low submission density group is clearly less positive.

The attitudes stated to the eleven different aspects of assignments for submission (= the eleven sub-variables which, together, constitute the variable) follow a uniform pattern. Therefore, we can choose the first of these sub-variables in order to study responses not only from completers but also from non-completers: "They [the assignments for submission] made my study work more pleasant and stimulating" (*appendix 6, table 45*).

Although those non-completers who responded to this item are not as enthusiastic as the completers, they nevertheless indicate a clearly favourable attitude towards the assignments for submission. The average value of the completers is 1.65, of the

non-completers 2.04. 87.9 per cent of the completers agree with the statement (49.6 per cent "strongly"); the corresponding proportion among the non-completers is 71 per cent (34.7 per cent "strongly").

It might be of interest to note that both multiple choice questions (in the computer-assisted courses/course versions) and more traditional assignment questions were considered stimulating—by non-completers as well as by completers.

6.3.3 Attitudes to the correction of and commenting on students' assignments

The variable *attitude to the correction of and commenting on students' assignments* is based on two statements, to which the students should mark their attitudes:

- With the tutor's correction of and comments on my answers I am . . . (a five degree scale: 1 = "very satisfied", 5 = "very dissatisfied")
- The comments to my corrected test papers were written in a personal and inspiring manner (a five degree scale: 1 = "strongly agree", 5 = "strongly disagree").

Thus, the maximum value of the composite variable is 10 (= a very negative attitude), and its minimum value 2 (= a very positive attitude). A completely neutral attitude would be represented by the value 6.

Table 46 shows the outcome. Evidently, the attitude is favourable in all the five courses/course versions, most markedly in the computer-assisted Swedish version of

Table 46. Results of experiments according to design 1: Attitude to the correction of and commenting on students' assignments, completers. (n.s. values refer to comparisons between experimental groups)

Course/course version and experimental group	f	M	sd	
YES 1 (H, comp.-ass.)	*65*	*2.74*	*0.91*	
8 submissions	25	2.68	0.69	
4 »	23	2.96	1.07	n.s.
2 »	17	2.53	0.94	
YES 1 (H, traditional)	*31*	*3.48*	*1.46*	
8 submissions	5	3.20	1.30	
4 »	13	3.38	0.96	n.s.
2 »	13	3.69	1.93	
Psychology, G.C. (comp.-ass.)	*70*	*3.10*	*1.36*	
8 submissions	24	3.13	1.57	
4 »	20	3.25	1.37	n.s.
2 »	26	2.96	1.18	
Psychology, G.C. (traditional)	*37*	*4.19*	*2.00*	
8 submissions	14	4.29	2.61	
4 »	9	3.89	1.54	n.s.
2 »	14	4.29	1.64	
Physics, E.C.	*77*	*3.47*	*1.46*	
8 submissions	28	3.55	1.59	
4 »	24	3.60	1.66	n.s.
2 »	25	3.24	1.05	

YES 1, and least clearly in the traditional version of Psychology, General Course. This positive attitude to the correction of and commenting on students' assignments apparently differs from what has been reported in several – although not all – previous studies, e.g. GRAHM (1969), GLATTER & WEDELL (1971), and PACKNETT (1973). (Cf. section 2.5.8.)

No significant differences between experimental groups were found.

Were also the non-completers satisfied with the handling of their answers to assignment questions? It appears so, judging from the attitudes of those non-completers who returned the dropout questionnaire and answered the question about the scrutiny given there (= the first of the two questions on this topic in the final questionnaire). The mean for this question is 1.51 with regard to completers, and 1.71 as concerns non-completers. 62.8 per cent of the completers strongly agreed, as compared with 50.0 per cent of the non-completers. See *appendix 6, table 47.*

6.3.4 Attitude to the submission density

The variable *attitude to the submission density* is also composed of two sub-variables which correspond to the following statements in the final questionnaire:

- In this course, there should be more submissions
- If I could choose, in other correspondence courses I should prefer submissions more frequently than in this course.

The extreme values of this variable are 2 ("strongly agree" with both statements) and 10 ("strongly disagree"), while a neutral attitude ("uncertain") is represented by the value 6.

The outcome is shown in *table 48.* When *combined*, the experimental groups of each course/course version show, largely, a neutral attitude. This is of no great interest, however, since the groups worked with course variants of different submission density.

When comparing different *experimental groups*, we find a common pattern:

- Groups with *low* submission density tend to *agree* with the statements that there should be more submissions; two submissions do not seem to be sufficient (except in YES 1, H, computer-assisted)
- Groups with *high* submission density tend to *disagree* with the statement: eight submissions appear to be enough
- Groups with the *regular* submission density in these courses (4 submissions) tend to converge around the neutral value "uncertain".

As concerns three of the courses/course versions, the differences between experimental groups are significant. In all the three cases, the relationship is strong (from $\eta^2 = 0.15$ to $\eta^2 = 0.32$).

Only the first of the sub-variables which constitute the composite variable has a counterpart in the dropout questionnaire: "In this course, there should be more submissions" (1 = strongly agree, 5 = strongly disagree). The answers from non-completers are shown in *appendix 6, table 49.* Those non-completers who returned the questionnaire and reacted to the statement tend to manifest roughly the same attitude as the completers.

6.3.5 The feelings of isolation in the study situation

We asked:

> When a person studies by means of a correspondence course, he may sometimes feel isolated. He is aware of working alone – with limited opportunities of obtain-

Table 48. Results of experiments according to design 1: Attitude to the submission density, completers. (n.s. statements, p values, and η^2 values refer to comparisons between experimental groups)

Course/course version and experimental group	f	M	sd	
YES 1 (H, comp.-ass.)	*64*	*6.47*	*1.86*	
8 submissions	25	7.00	1.55	n.s.
4 »	22	6.36	1.97	
2 »	17	5.82	2.01	
YES 1 (H, traditional)	*30*	*5.53*	*2.19*	$0.001 < p < 0.01$
8 submissions	5	7.40	2.61	$\eta^2 = 0.32$
4 »	11	6.27	2.00	
2 »	14	4.29	1.44	
Psychology, G.C. (comp.-ass.)	*70*	*5.39*	*2.11*	
8 submissions	24	6.00	1.93	n.s.
4 »	20	5.50	2.35	
2 »	26	4.73	1.95	
Psychology, G.C. (traditional)	*38*	*6.13*	*2.41*	$0.001 < p < 0.01$
8 submissions	15	7.73	2.09	$\eta^2 = 0.30$
4 »	9	5.33	1.94	
2 »	14	4.93	2.13	
Physics, E.C.	*77*	*6.17*	*2.26*	$0.001 < p < 0.01$
8 submissions	28	7.00	2.07	$\eta^2 = 0.15$
4 »	24	6.48	2.20	
2 »	25	4.92	2.06	

ing support and help, compelled to manage his studies completely by himself. While you have been studying this course, have you felt isolated in this way?

The response alternatives run on a five degree scale from "Yes, to a great extent" (=value 1) to "No, not at all" (=value 5). The outcome is reported in *table 50.*

Obviously, the answers take a mainly negative direction. According to the central tendency, shown in the table, the completers did not feel particularly isolated in their study situation.

No significant differences between experimental groups can be proved.

The distributions of answers from non-completers as well as from completers are shown in *appendix 6, table 51.* In both cases, the distributions are U-shaped. 31.0 per cent of the completers state that they have felt isolated (only 2.8 per cent "to a high degree"), whereas 56.6 per cent deny this feeling (27.4 per cent "not at all"). The corresponding proportions among the non-completers are 42.6 (6.2 per cent "to a high degree") and 43.1 per cent (18.5 per cent "not at all"). Similar results were obtained by FLINCK (1978, pp. 72, 90, 99, 132; cf. above, section 2.6).

Among the non-completers, students of Psychology, General Course (traditional) diverge from the general pattern. In this course version, a majority (60 per cent) declare that they have felt isolated, at least to some extent.

Table 50. Results of experiments according to design 1: The feeling of isolation in the study situation, completers. (n.s. values refer to comparisons between experimental groups)

Course/course version and experimental group	f	M	sd	
YES 1 (H, comp.-ass.)	*65*	*3.68*	*1.28*	
8 submissions	25	3.72	1.24	n.s.
4 »-	23	3.43	1.34	
2 »-	17	3.94	1.25	
YES 1 (H, traditional)	*32*	*3.47*	*1.16*	
8 submissions	5	4.00	1.41	n.s.
4 »-	13	3.77	0.73	
2 »-	14	3.00	1.30	
Psychology, G.C. (comp.-ass.)	*69*	*3.45*	*1.28*	
8 submissions	23	3.26	1.18	n.s.
4 »-	20	3.40	1.31	
2 »-	26	3.65	1.35	
Psychology, G.C. (traditional)	*38*	*3.32*	*1.14*	
8 submissions	15	3.67	1.18	n.s.
4 »-	9	3.00	1.00	
2 »-	14	3.14	1.17	
Physics, E.C.	*77*	*3.51*	*1.27*	
8 submissions	28	3.11	1.36	n.s.
4 »-	24	3.75	1.12	
2 »-	25	3.52	1.21	

6.3.6 The wish for other kinds of support in the studies than can be provided by means of pure correspondence education

The variable *the wish for other kinds of support in the studies . . .* is composed of three sub-variables which correspond to the following statements:

- The correspondence tutor should telephone the students sometimes
- There should be an opportunity of meeting other students of the same course sometimes
- There should be an opportunity of meeting the correspondence tutor or another teacher sometimes to get some oral instruction.

The extreme values of the variable are 3 ("strongly agree" with all three statements) and 15 ("strongly disagree"), while a neutral attitude ("uncertain") is represented by the value 9.

An account of the outcome is provided in *table 52.* In all the courses/course versions, the central tendency indicates a slight general wish for simultaneous two-way communication as a supplement to the delayed distant contacts provided by pure correspondence education. This result is in accordance with what has been found in previous investigations (cf. 2.7).

Table 52. Results of experiments according to design 1: The wish for other kinds of support in the studies than can be provided by means of pure correspondence education, completers. (n.s. statements refer to comparisons between experimental groups)

Course/course version and experimental group	f	M	sd	
YES 1 (H, comp.-ass.)	*64*	*8.48*	*2.10*	
8 submissions	25	8.76	1.59	n.s.
4 »-	23	8.30	2.58	
2 »-	16	8.31	2.12	
YES 1 (H, traditional)	*29*	*7.69*	*2.00*	
8 submissions	5	8.40	1.95	n.s.
4 »-	11	7.82	2.48	
2 »-	13	7.31	1.60	
Psychology, G.C. (comp.-ass.)	*70*	*8.07*	*2.42*	
8 submissions	24	7.63	2.86	n.s.
4 »-	20	8.55	2.28	
2 »-	26	8.12	2.07	
Psychology, G.C. (traditional)	*38*	*7.95*	*2.65*	
8 submissions	15	8.47	3.11	n.s.
4 »-	9	7.33	2.35	
2 »-	14	7.79	2.36	
Physics, E.C.	*77*	*8.09*	*2.43*	
8 submissions	28	7.41	2.29	n.s.
4 »-	24	8.56	2.84	
2 »-	25	8.40	2.02	

No significant differences between experimental groups were found.

As concerns the sub-variables, the most positive attitudes were shown towards the third statement (about face-to-face teaching), by non-completers as well as by completers. See *appendix 6, table 53.* 53.4 per cent of the completers and 56.1 per cent of the non-completers were in favour of some additional face-to-face instruction ("strongly agree": 16.1 per cent and 28.6 per cent, respectively).

6.4 Final test results

The results of the final tests are surveyed in *table 54.* Completers of both versions of YES 1 took one identical final test; the same applies to the two versions of Psychology, General Course (see 4.6.1). In these two tests, as well as in the Physics, Elementary Course test, the maximum mark possible is 40 points. According to the school, the results agree well with marks generally given to the school's students of these subjects in official examinations.

As is evident from the table, no significant differences between experimental groups could be established.

Table 54. Results of experiments according to design 1: [illegible]al tests, completers. (n.s. statements refer to comparisons between experimental groups)

Course/course version and experimental group	f	M	sd	
YES 1 (H, comp.-ass.)	*64*	*27.50*	*7.59*	
8 submissions	24	28.50	8.96	n.s.
4 »-	24	26.83	7.11	
2 »-	16	27.00	6.24	
YES 1 (H, traditional)	*31*	*27.42*	*7.99*	
8 submissions	5	31.80	5.76	n.s.
4 »-	12	28.50	7.19	
2 »-	14	24.93	8.84	
Psychology, G.C. (comp.-ass.)	*67*	*22.70*	*7.57*	
8 submissions	24	20.38	8.09	n.s.
4 »-	20	25.00	6.55	
2 »-	23	23.13	7.47	
Psychology, G.C. (traditional)	*37*	*20.97*	*8.49*	
8 submissions	15	21.00	10.52	n.s.
4 »-	8	20.50	7.84	
2 »-	14	21.21	6.87	
Physics, E.C.	*77*	*24.36*	*6.60*	
8 submissions	28	24.61	5.20	n.s.
4 »-	24	25.58	6.48	
2 »-	25	22.92	7.97	

6.5 Study time variables

6.5.1 Gross study time

Gross study time refers to the time which elapses from a student's application for a course until he completes it, i.e. submits the last assignments for correction and comments. (Cf. 1.6 and 2.8.3.) Gross study time is measured in weeks.

Table 55 shows the outcome. We see that the average gross study time as regards courses/course versions varies from about 25 weeks (i.e., approximately half a year) to around 37 weeks (i.e., nearly nine months).

Two significant differences between experimental groups were found: in YES 1, the two Swedish versions. In both cases, the high-submission density group (8 submissions) used the longest gross study time. In the traditional version, the relationship is very strong ($\eta^2 = 0.45$).

As indicated by the standard deviations in table 55, there is—in most cases—a most appreciable variation *within* groups. *Table 56* shows that the difference between the fastest and the slowest completer in each course/course version is very great. Whereas the fastest student finished the whole course in a few—or even only two—weeks, the slowest utilized more than a year, in two of the courses/course versions even more than two years.

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Table 55. Results of experiments according to design 1: Gross study time (in weeks), completers. (n.s. statements, p values, and η^2 values refer to comparisons between experimental groups)

Course/course version and experimental group	f	M	sd	
YES 1 (H, comp.-ass.)	*69*	*32.43*	*25.31*	$0.02 < p < 0.05$
8 submissions	26	40.00	31.07	$\eta^2 = 0.09$
4 »-	26	32.88	23.41	
2 »-	17	20.18	10.25	
YES 1 (H, traditional)	*40*	*25.05*	*18.47*	$p < 0.001$
8 submissions	6	54.17	9.45	$\eta^2 = 0.45$
4 »-	15	19.27	17.01	
2 »-	19	20.42	12.51	
Psychology, G.C. (comp.-ass.)	*70*	*24.29*	*15.98*	
8 submissions	24	26.79	13.11	n.s.
4 »-	20	25.60	19.13	
2 »-	26	20.96	15.80	
Psychology, G.C. (traditional)	*39*	*36.85*	*31.11*	
8 submissions	15	42.87	34.56	n.s.
4 »-	10	32.30	22.00	
2 »-	14	33.64	33.75	
Physics, E.C.	*82*	*25.59*	*21.22*	
8 submissions	29	27.38	17.53	n.s.
4 »-	26	25.65	20.30	
2 »-	27	23.60	25.85	

Table 56. Gross study time (weeks): extreme values

Course/course version	Lowest value	Highest	M
YES 1 (H, comp.-ass.)	2	106	32.43
YES 1 (H, traditional)	5	69	25.05
Psychology, G.C. (comp.-ass.)	4	74	24.29
Psychology, G.C. (traditional)	4	126	36.85
Physics, E.C.	2	102	25.59

6.5.2 Net study time

Net study time refers to the effective time spent by a course taker on his/her studies (cf. 1.6 and 2.8.3). At the end of each study unit, the net study time was estimated (in hours) by the students themselves, after which the values of each student were added up to a total net study time.

Table 57 shows the outcome. Due to the considerable data loss as concerns this variable (33.4 per cent), differences between experimental groups were not tested statistically. However, based on the available data, the submission density of each experimental variant of the courses/course versions was estimated as the ratio of net study time to number of submissions. (Cf. BÅÅTH, 1975, and above, section 2.5.3.)

Table 57. Results of experiments according to design 1: Net study time (in hours), as well as estimations of submission density (calculated as net study time divided by the number of submissions), completers

Course/course version and experimental group	f	M	sd	Estimated submission density
YES 1 (H, comp.-ass.)	*49*	*75.75*	*73.50*	–
8 submissions	19	87.44	102.60	10.93
4 »-	18	67.46	49.07	16.87
2 »-	12	69.69	47.35	34.84
YES 1 (H, traditional)	*15*	*76.10*	*88.36*	–
8 submissions	2	34.00	1.41	17.00
4 »-	5	101.50	148.08	25.38
2 »-	8	70.75	45.63	35.38
Psychology, G.C. (comp.-ass.)	*46*	*53.85*	*31.29*	–
8 submissions	17	56.74	31.84	7.09
4 »-	11	53.50	26.55	13.38
2 »-	18	51.33	34.74	25.67
Psychology, G.C. (traditional)	*25*	*61.58*	*39.25*	–
8 submissions	8	74.00	49.53	9.25
4 »-	6	59.67	36.54	14.92
2 »-	11	53.59	31.69	26.80
Physics, E.C.	*59*	*59.55*	*43.44*	–
8 submissions	22	55.30	34.66	6.91
4 »-	16	68.74	44.78	17.19
2 »-	21	57.00	51.12	28.50

As concerns courses/course versions, the average net study time apparently varies between approximately 50 and 75 hours. Also in this table, the standard deviations indicate a most considerable within-group variation. In *table 58*, the extreme values of completers in each course/course version are shown. The differences between the fastest and the slowest completing students are here as pronounced as they are with regard to gross study time. Whereas the fastest participant of each course/course version maintains that he or she utilized only between 9.5 and 17 hours on the whole course, the slowest reports between 200 and 382 study hours. Although this dispersion might appear surprising, it agrees comparatively well with what I found in the pre-study (BÅÅTH, 1975; cf. above, 2.8.3).

Table 58. Net study time (hours): extreme values

Course/course version	Lowest value	Highest	M
YES 1 (H, comp.-ass.)	9.5	382.0	75.75
YES 1 (H, traditional)	10.0	360.0	76.10
Psychology, G.C. (comp.-ass.)	17.0	200.0	53.85
Psychology, G.C. (traditional)	14.0	300.0	61.58
Physics, E.C.	11.0	220.0	59.55

According to the same pre-study (BAATH, 1975), the three courses in question had the following estimated values of submission density (net study hours per study unit):

YES 1 (H, traditional)	13
Psychology, G.C. (traditional)	19
Physics, E.C.	12

This can be compared with the values of estimated submission density shown in table 57 as regards the four-submissions variants (round figures): YES 1 17 and 25 hours (two versions), Psychology, General Course 13 and 15 hours (two versions), Physics, Elementary Course 17 hours. The discrepancies might be due to the considerable data loss with regard to net study time in this study, and/or deficiencies of the pre-study (i.e., with regard to sampling). Another possible interpretation is that the way of measuring net study time applied here is not very reliable. It should be noted, however, that the main results concerning net study time agree fairly well with the data on gross study time previously shown.

It is also evident from table 57 that the estimated submission density, calculated as net study time per study unit, is approximately inversely proportional to the number of submissions (= the number of study units) in the course—a completely reasonable finding. The most obvious examples of this relationship are Psychology, General Course (computer-assisted) and Physics, Elementary Course.

6.6 Discussion

In this section I will first show how certain intake variables are related to outcome variables, in order to discuss possible sources of error in the light of these facts. After that follows, in 6.6.2, a survey and discussion of the results reported in section 6.2–6.5.

6.6.1 Possible sources of error

Three possible sources of error will be considered here:

- Initial differences between experimental groups
- Initial differences between completers and non-completers
- Differential data loss in the experimental groups of the Swedish traditional YES 1 version.

The differences between experimental groups with regard to enrolment questionnaire variables were summarized in *table 26* (section 4.7.2). As concerns experiments according to design 1, the total number of significance testings surveyed in table 26 were 84; only 7 significant differences were found. This may be regarded as a random outcome, since the significance level was $\alpha = 0.10$. Nevertheless, in order to shed some additional light on the possible source of error which is represented by the skewed distributions obtained, I will show how the majority of the intake variables in question are related to the outcome variables start and completion. See *table 59*.

As is clear from the table, significant differences were found in 11 of the 132 statistical testings (χ^2 analysis with the same significance level as in the statistical testings of experimental outcome, i.e., $\alpha = 0.05$):

Sex: Women started their courses to a larger extent than men, in YES 1 (both versions).

Age: Students of the age groups 21–30 and > 50 years got started to a larger extent than the remaining age groups, in YES 1 (H, traditional).

Table 59. Experiments according to design 1: Start and completion cross-tabulated by enrolment questionnaire variables. Significant differences: * = on the 5 per cent level, ** = on the 1 per cent level

Course/course version and outcome variable	Enrolment questionnaire variable										
	1	2	6	7	8	9:1	9:2	9:3	10:A	10:B	10:C
YES 1 (H, comp.-ass.)											
Start	**		*				*				
Completion					**		*				
YES 1 (H, traditional)											
Start	*	*									
Completion											
Psychology, G.C. (comp.-ass.)											
Start											
Completion				*							
Psychology, G.C. (traditional)											
Start				*							
Completion											
Physics, E.C.											
Start				*							
Completion											
Advanced Economics											
Start								**			
Completion											

Enrolment questionnaire variables

1 – Sex
2 – Age
6 – Educational level
7 – Previous correspondence study
8 – Parallel correspondence study
9:1 – "Social motivation"
9:2 – Extrinsic motivation
9:3 – Intrinsic motivation
10:A – Supposed advantages of the study form
10:B – External conditions (employer or geographical circumstances)
10:C – Difficulties to combine one's work with another study form

Educational level: Students at a lower educational level started their courses to a larger extent than students at a higher educational level, in YES 1 (H, computer-assisted).

Previous correspondence study: Students with previous experience of correspondence study got started to a larger extent than other students of Psychology, General Course (traditional) and Psysics, Elementary Course. In Psychology, General Course (computer-assisted), such students completed their courses to a larger extent.

Parallel correspondence study: Students who did not take another correspondence course at the same time completed their courses to a larger extent than other students of YES 1 (H, computer-assisted).

Extrinsic motivation: In YES 1 (H, computer-assisted) students less markedly directed towards extrinsic goals started and completed their courses to a larger extent than participants with a high degree of extrinsic motivation.

Intrinsic motivation: In Advanced Economics, course takers less markedly directed towards intrinsic goals got started to a larger extent than students with a high degree of intrinsic motivation.

A few of these results—those referring to motivational variables—were unexpected. The remaining significant differences are, largely, in accordance with what has been reported by DONEHOWER (1968), REKKEDAL (1971, 1978), LOCKWOOD (1973), and WANGDAHL (1979), among others (cf. 2.8.1).

How do the initial differences between experimental groups (according to table 26) relate to the findings shown in table 59? A comparison proves that there is no correspondence between the two tables. In no case does an initial difference with regard to one of the enrolment questionnaire variables coincide with an established relationship between this variable and any of the outcome variables start and completion. Obviously, this strengthens the assumption that the differences summarized in table 26 are negligible, as far as the experiments according to design 1 are concerned.

The initial differences between completers and non-completers as regards enrolment questionnaire variables were summarized in *table 29* (section 5.2.2). With reference to experiments according to design 1, the number of significance testings surveyed in table 29 were 70; 8 significant differences were found. This is very close to a random outcome ($\alpha = 0.10$). However, one of the 14 intake variables—previous correspondence study—appeared to be more interesting than the others in this context, since it was involved in one third of the 18 significant differences summarized in table 29. Therefore, separate analyses of the relationships between this enrolment questionnaire variable and final questionnaire variables were performed. The result as concerns experiments according to design 1 is shown in *table 60*.

As can be seen, no more than two significant differences were found. In Psychology, General Course (computer-assisted), students without previous experience of correspondence study would like to have more submission occasions than students with such experience. In the traditional version of the same course, students without previous experience adopt more favourable attitudes towards supplementary face-to-face teaching (etc.) than students with experience.

Only with regard to the first one of this results is there a correspondence between tables 29 and 60. Consequently, it may be assumed that the experimental outcome as concerns attitude variables do not refer to a severely biased student group (this possible bias being caused by the large proportion of non-completers), but are generalizable to the population.

In section 5.2.2 I also pointed to the additional loss of data in YES 1 (H, traditional) as concerns the final questionnaire and the final test (cf. *table 28*). To some extent, this data loss is unevenly distributed on the experimental groups with regard to the enrolment questionnaire variables age, educational level, and previous correspondence study (*appendix 6*, *tables 32* and *33*). Consequently, the loss could bias the

Table 60. Experiments according to design 1: Attitude variables analysed by the enrolment questionnaire variable *Previous correspondence study*. Significant differences between students with and without previous experience of correspondence study: * = on the 5 per cent level

Course/course version	Attitude variable					
	1	2	4	5	8	9
YES 1 (H, comp.-ass.)						
YES 1 (H, traditional)						
Psychology, G.C. (comp.-ass.)				*		
Psychology, G.C. (traditional)						*
Physics, E.C.						

Attitude 1: Attitude to the course and the teaching
2: Attitude to the assignments for submission
4: Attitude to the correction of and commenting on assignments
5: Attitude to the submission density
8: Feeling of isolation in the study situation
9: Wish for other kinds of support in the studies than can be provided by means of pure correspondence education

experimental results for this course ver ion. Separate analyses indicate, however, that there are no relationships between any f the first two intake variables and the attitude variables, as concerns the traditional Swedish version of YES 1. A similar lack of relationship regarding the third intake variable–previous correspondence study–was illustrated in table 60. It may therefore be concluded that the particular loss of data in this course version did not affect the experimental outcome.

6.6.2 Survey and discussion of the results

On a **descriptive** level, the results can be summarized like this:

1 The degree of *study perseverance* is not very high. No more than 51.6 per cent of the participants started sending in their answers, and only 25.1 per cent completed their courses. Advanced Economics shows the lowest degree of study perseverance (39.6 per cent starters; 8.4 per cent completers), and Physics, Elementary Course the highest (65.3 per cent starters; 43.5 per cent completers).

2 The *attitudes* to the course and the teaching as a whole, to the assignments for submission, and to the correction of and commenting on students' assignments are generally very favourable. The attitude to the submission density varies with the experimental treatment around a neutral average value. A majority of the students deny that they felt isolated in their study situation. Nevertheless, there is a slightly favourable average attitude to other kinds of support in the studies than can be provided by means of pure correspondence education. As concerns supplementary face-to-face teaching, this attitude is clearly positive.

3 According to the assessment of the school, the *final test results* are satisfying.

4 The average *study time* is moderately long, from about half a year to approximately nine months (gross study time), and from around 50 to about 75 hours (net study time). The individual variations are very great, however.

As concerns attitudes, final test results, and study time, the above survey applies only to *completers*. With regard to attitudes, data obtained by means of the dropout questionnaire were also reported. Largely, these data agree with the answers (given by completers) to the final questionnaire, although the non-completers' attitudes

were, in general, slightly less favourable. We do not know anything, however, about the attitudes of the great number of non-completers (50.5 per cent in the five courses/course versions in question) who did not return the dropout questionnaire. The answers to the dropout questionnaire should therefore be interpreted with great care.

As compared with results from other investigations, the degree of study perseverance is apparently rather low, whereas the attitude to the correction of and commenting on students' assignments is more positive than has been reported in several previous studies. The remaining outcome is, largely, in accordance with results from other investigations.

A survey of the **experimental** results is provided in *table 61*.

Table 61. Survey of experimental results, experiments according to design 1. Significant differences' * =on the 5 per cent level, ** =on the 1 per cent level, *** =on the 0,1 per cent level

Course/course version	Outcome variables										
	Start	Completion	Attitude						Final test	Gross study time
			1	2	4	5	8	9		
YES 1 (H, comp.-ass.)	***									*
YES 1 (H, traditional)		*				**				***
Psychology, G.C. (comp.-ass.)	*									
Psychology, G.C. (traditional)	**					**				
Physics, E.C.	***			**		**				
Advanced Economics	***	*								

Attitude 1: Attitude to the course and the teaching
2: Attitude to the assignments for submission
4: Attitude to the correction of and commenting on students' assignments
5: Attitude to the submission density
8: Feeling of isolation in the study situation
9: Wish for other kinds of support in the studies than can be provided by means of pure correspondence education

In all, 52 significance tests were performed, and 13 significant differences were found. This is considerably more than could be expected as a result of mere chance ($\alpha = 0.05$).

One comparatively clear-cut result was obtained – with regard to *start*. In five cases out of six, significant differences between experimental groups were found as concerns this variable. Consequently, the first hypothesis has apparently been confirmed: *Various degrees of submission density lead to differences with regard to start*. In addition, all the differences take the same direction: higher submission density entails a higher proportion of starters. The strength of the relationship is, in most cases, more than negligible. Thus – in the courses investigated – higher submission density increases the probability of a correspondence student's starting to submit assignments, whereas lower submission density decreases the probability of start, in this meaning of the term.

Most likely, this result is due to the fact that the size of study units in a correspondence course is conversely proportional to the submission density. Higher submission density means shorter study units; lower submission density leads to more extensive study units. (Cf. BÅÅTH, 1975, figure 2, p. 3.) Consequently, the size of the *first* study unit is also affected by the submission density of the course. If the submission density of a course is high, that part of the course which has to be worked through before the student reaches the first submission occasion probably seems

less deterrent than in cases where the submission density is low and the first study unit is, consequently, more extensive.

No similar unequivocal pattern came out in relation to the second study perseverance variable, *completion*. Two significant differences were found; they take diverging directions, however. Therefore, the result is very difficult to interpret.

With regard to one of the attitude variables, there is one comparatively clear result: concerning *attitude to the submission density*. In three cases out of five possible, significant differences were found. We may therefore conclude that, regarding this variable, the hypothesis was confirmed in a majority of those courses/course versions where significance testings were possible: *Various degrees of submission density lead to differences with regard to the attitude to the submission density*. All three differences take the same direction, and the relationships are comparatively strong.

In addition, the differences–statistically non-significant–between groups in the remaining two experiments seem to support the experimental result: Groups who have studied a course variant with high submission density are hesitant to an increase of the number of submissions, whereas groups having studied a low-submission density variant favour such an increase. Students who were allocated to regular course variants (with medium submission density) tend to converge around the neutral answer "uncertain"; their opinions differ about the desirability of increasing the submission density.

With regard to attitude variables, only one further significant difference was proved: concerning the *attitude to the assignments for submission*. In Physics, E.C., higher submission density was found to be related to a more favourable attitude towards assignments for submission.

As to the rest, two significant differences concerning *gross study time* were found. In both cases (the two Swedish versions of YES 1), the high submission density group spent the longest time on their studies. With regard to one of the versions, the magnitude of the relationship is most considerable. The variation of submission density has apparently given rise to these differences. Moreover, the non-significant differences between groups in the remaining three experiments take the same direction.

The outcome regarding gross study time is hardly easy to interpret. It is of course possible that some of the students, after having sent in their solutions for scrutiny on one occasion, did not begin their work on the following study unit until the solutions had been returned, corrected and commented on. If so, this would have prolonged the gross study time more for students of the eight-submissions groups than for participants in the other groups. This explanation can hardly be sufficient, however. An alternative or additional explanation could be that higher submission density invites to a more thorough study of details in the course material. Still, the available data as concerns *net* study time (table 57) support this assumption only to a slight extent.

By way of summary, five of the hypotheses related to experiments according to design 1 were supported with regard to one or more of the courses/course versions. Concerning two of the outcome variables, start and attitude to the submission density, the hypotheses may be considered as confirmed.

In chapter 9 I will return to the experiments according to design 1 for a discussion of the theoretical and practical implications of these findings.

7 Results of experiments according to design 2

7.1 Introduction

The experiments that were carried through according to design 2 (4.5.2) refer to problem area 2, the possibility of replacing a substantial part of the assignments for submission by self-check exercises. In two courses/course versions, the quantity of assignment questions per submission occasion was systematically varied and all omitted assignment questions were used as self-check exercises with model answers and comments, which correspond–as far as possible–to the comments provided by the computer when scrutinizing the assignments for submission. These were the two courses/course versions:

YES 1 (NKS)
Psychology of Management.

One more experiment of the same type was planned (Physics, Elementary Course, NKI-skolen, Norwegian version). Due to an unexpected change of the course programme at the school (cf. table 10, section 4.2.2), it had to be cancelled, however.

The results of the experiments according to design 2 will be presented in the same way as was followed in chapter 6. Differences between experimental groups were tested by means of two-way analyses of variance (significance level: $\alpha = 0.05$). When a significant difference was found, the strength of the relationship, η^2, was also computed.

7.2 Study perseverance variables

7.2.1 Start

Table 62 shows the proportion of starters for both courses/course versions. We can see that the number of starters amounts to about three fourths of all the participants –72.7 per cent (YES 1, NKS) and 77.1 per cent (Psychology of Management), respectively. This proportion is considerably higher than was the case with the courses/course versions used for experiments according to design 1. Students of various groups in each of the two experiments started to approximately the same extent. No significant differences were established, neither with regard to main effects, nor as concerns interaction between number of submissions and number of assignment questions per submission.

7.2.2 Completion

As is obvious from *table 63*, a great number of those students of Psychology of Management who started submitting assignments also completed their course: no less than 65.7 per cent of the total number of applicants. In YES 1 (NKS), a higher proportion dropped out. Still, the completion rate is here as high as 40.6 per cent (higher than in the Swedish versions of the same course).

Table 62. Results of experiments according to design 2: Start.

Course/course version and experimental group	Starters	Non-starters	Σ	
YES 1 (NKS)	*181*	*68*	*249*	Factor A: n.s.
8 x 12 ass. questions	42	18	60	Factor B: n.s.
8 x 6 »	49	14	63	A x B: n.s.
4 x 12 »	46	17	63	
4 x 6 »	44	19	63	
Psychology of M.	*109*	*31*	*140*	Factor A: n.s.
4 x 16 ass. questions	32	6	38	Factor B: n.s.
4 x 8 »	28	6	34	A x B: n.s.
2 x 16 »	22	9	31	
2 x 8 »	27	10	37	
Σ	*290*	*99*	*389*	

Factor A: Number of submissions
Factor B: Number of assignment questions per submission

Table 63. Results of experiments according to design 2: Completion

Course/course version and experimental group	Completers	Drop-outs	Σ	
YES 1 (NKS)	*101*	*148*	*249*	Factor A: n.s.
8 x 12 ass. questions	24	36	60	Factor B: n.s.
8 x 6 »	22	41	63	A x B: n.s.
4 x 12 »	32	31	63	
4 x 6 »	23	40	63	
Psychology of M.	*92*	*48*	*140*	Factor A: n.s.
4 x 16 ass. questions	26	12	38	Factor B: n.s.
4 x 8 »	24	10	34	A x B: n.s.
2 x 16 »	20	11	31	
2 x 8 »	22	15	37	
Σ	*193*	*196*	*389*	

Factors A and B: see table 62

No significant differences between experimental groups were found.

7.3 Attitude variables

7.3.1 Attitudes to the course and the teaching

The composite variable *attitude to the course and the teaching* was described in 6.3.1. It varies from 9 (positive) to 43 (negative), with 26 as a neutral medium value. The outcome with regard to this variable is shown in *table 64.*

As in experiments according to design 1, the completers adopt clearly favourable attitudes to the course and the teaching as a whole. No significant differences between experimental groups can be proved.

Table 64. Results of experiments according to design 2: attitude to the course and the teaching, completers

Course/course version and experimental group	f	M	sd	
YES I (NKS)	*91*	*18.05*	*3.44*	Factor A: n.s.
8 x 12 ass. questions	25	17.96	3.62	Factor B: n.s.
8 x 6 »	19	17.63	2.24	A x B: n.s.
4 x 12 »	28	18.93	3.83	
4 x 6 »	19	17.32	3.56	
Psychology of M.	*86*	*18.48*	*3.29*	Factor A: n.s.
4 x 16 ass. questions	24	18.92	4.33	Factor B: n.s.
4 x 8 »	24	17.33	2.60	A x B: n.s.
2 x 16 »	19	19.16	3.17	
2 x 8 »	19	18.68	2.40	

Factors A and B: see table 62

In *appendix 6*, *table 65* is shown how completers and non-completers reacted to one of the statements of which this variable is composed. The statement deals with the course as a whole (1 = "the course has surpassed by far my expectations"; 5 = "the course has not come up at all to my expectations"; cf. section 6.3.1 and appendix 6, table 42).

The distributions of answers are similar to those found with regard to the same statement in experiments according to design 1 (app. 6, table 42):

- Non-completers are somewhat more moderate in their attitudes than completers
- Yet, the clearly typical response, given by both categories, is: "The course has come up to my expectations" (=value 3).

Table 66 (appendix 6) shows the distributions of completers and non-completers as regards another of the sub-variables making up the composite variable. This item refers to the attitude towards correspondence education in general (1 = "a very good way of studying", 5 = "a very poor way of studying"; cf. section 6.3.1 and appendix 6, table 43).

Also in this case, the data are very similar to those reported with reference to experiments according to design 1. The completers of both courses/course versions are markedly favourable (M = 1.52; 56.7 per cent "a very good way of studying"), while the non-completers are more restrained–but still clearly positive (M = 2.16; 21.6 per cent "a very good way of studying").

7.3.2 Attitudes to the assignments for submission

The composite variable *attitude to the assignments for submission* was described in section 6.3.2. It varies from 11 (positive) to 55 (negative), with 33 as a neutral medium value. *Table 67* shows the outcome: the attitudes are clearly positive among the completers.

No significant differences between experimental groups were found.

Table 68 in *appendix 6* summarizes how non-completers as well as completers responded to the statement "They [= the assignments for submission] made my study work more pleasant and stimulating" (i.e., the first of the eleven sub-variables constituting the composite variable). Evidently, also the majority of the (rather few) non-completers, who returned the dropout questionnaire and had made use of at least a part of the assignments for submission, were positive towards the assignments (M = 1.84), although not as positive as the completers (M = 1.55).

Table 67. Results of experiments according to design 2: Attitude to the assignments for submission, completers

Course/course version and experimental group	f	M	sd	
YES 1 (NKS)	*89*	*21.02*	*5.90*	Factor A: n.s.
8 x 12 ass. questions	23	20.78	6.71	Factor B: n.s.
8 x 6 »-	20	20.20	6.14	A x B: n.s.
4 x 12 »-	27	21.81	5.31	
4 x 6 »-	19	21.05	5.71	
Psychology of M.	*85*	*20.58*	*6.21*	Factor A: n.s.
4 x 16 ass. questions	22	20.14	6.85	Factor B: n.s.
4 x 8 »-	24	19.67	5.54	A x B: n.s.
2 x 16 »-	19	21.37	6.95	
2 x 8 »-	20	21.40	5.73	

Factors A and B: see table 62

7.3.3 Attitudes to the correction of and commenting on students' assignments

The variable *attitude to the correction of . . .* was described in section 6.3.3. It varies between 2 (positive) and 10 (negative), with 6 as a neutral medium value. The outcome is shown in *table 69.*

The table indicates very favourable attitudes among the completers, most clearly accentuated in Psychology of Management.

One significant difference between experimental groups was established for YES 1 (NKS), with regard to factor A. The eight-submissions groups manifest more positive attitudes than do the four-submissions groups. The relationship is rather weak, however ($\eta^2 = 0.04$).

Like non-completers in courses/course versions used for experiments according to design 1, dropouts of YES 1 (NKS) and Psychology of Management are almost as positive to the handling of their solutions as the completers are—judging from the responses to one of the statements on this topic (*appendix 6, table 70*).

Table 69. Results of experiments according to design 2: Attitude to the correction of and commenting on students' assignments, completers

Course/course version and experimental group	f	M	sd	
YES 1 (NKS)	*91*	*3.51*	*1.53*	Factor A:
8 x 12 ass. questions	25	3.28	1.17	$0.02 < p < 0.05$
8 x 6 »-	19	3.05	1.39	Factor B: n.s.
4 x 12 »-	28	4.07	1.88	A x B: n.s.
4 x 6 »-	19	3.47	1.35	η^2 for A: 0.04
Psychology of M.	*87*	*2.91*	*1.19*	Factor A: n.s.
4 x 16 ass. questions	24	2.96	1.57	Factor B: n.s.
4 x 8 »-	24	2.58	0.72	A x B: n.s.
2 x 16 »-	19	3.00	1.15	
2 x 8 »-	20	3.15	1.14	

Factors A and B: see table 62

7.3.4 Attitudes to the number of assignment questions per submission

The variable *attitude to the number of assignment questions per submission* is composed of two sub-variables which correspond to the following statements in the final questionnaire:

- In this course, there should be more assignment questions on each submission occasion
- If I could choose, in other correspondence courses I should prefer more assignment questions on each submission occasion than in this course.

The extreme values of this variable are 2 (positive) and 10 (negative), with 6 as a neutral medium value.

The outcome is shown in *table 71*. When *combined*, the experimental groups of both courses/course versions show a completely neutral attitude. Since the groups had been given course variants with different quantities of assignment questions, only the *group values* are of real interest, however. The groups with the lowest number of assignment questions per submission (6 and 8, respectively) appear to be more positive to an increase of questions on each occasion. This applies to both courses/course versions, but the difference is significant only in Psychology of Management. Most of the latter difference is caused by the 2 x 8 assignment questions group, the members of which are markedly more in favour of an increase of the quantity of assignment questions per submission than are the members of the other groups. Yet, the relationship is rather weak ($\eta^2 = 0.05$).

Table 71. Results of experiments according to design 2: Attitude to the number of assignment questions per submission, completers

Course/course version and experimental group	f	M	sd	
YES 1 (NKS)	*91*	*6.00*	*2.14*	Factor A: n.s.
8 x 12 ass. questions	25	6.52	2.00	Factor B: n.s.
8 x 6 »	19	5.52	2.06	A x B: n.s.
4 x 12 »	28	6.11	2.41	
4 x 6 »	19	5.68	1.95	
Psychology of M.	*87*	*6.00*	*2.25*	Factor A: n.s.
4 x 16 ass. questions	24	6.71	1.85	Factor B:
4 x 8 »	24	6.08	2.06	$0.02 < p < 0.05$
2 x 16 »	19	6.29	2.40	A x B: n.s.
2 x 8 »	20	4.80	2.44	η^2 for B: 0.05

Factors A and B: see table 62

Among the non-completers, no groups manifest positive attitudes towards the increase of assignment questions suggested, judging from the responses to one of the sub-variable statements. On the whole, their attitudes seem to be less favourable than is the case with the completers ($M_{completers} = 2.99$; $M_{completers} = 3.64$). See *appendix 6, table 72.*

7.3.5 Attitudes to replacing assignments for submission by self-check exercises

The variable *attitude to replacing assignments for submission by self-check exercises* corresponds to the following statement in the final questionnaire: "The assignments

for submission could just as well be replaced by self-check exercises with model answers" (1 = strongly agree, 5 = strongly disagree).

The outcome is shown in *table 73*. Evidently, the overall attitude is clearly negative, which may be regarded as another way of stating the favourable attitude towards assignments for submission reported in section 7.3.2. No significant difference between experimental groups were found.

Table 73. Results of experiments according to design 2: Attitude to replacing the assignments for submission by self-check exercises, completers

Course/course version and experimental group	f	M	sd	
YES 1 (NKS)	*90*	*3.82*	*1.02*	Factor A: n.s.
8 x 12 ass. questions	24	4.17	0.87	Factor B: n.s.
8 x 6 »	20	3.70	0.97	A x B: n.s.
4 x 12 »	27	3.70	1.10	
4 x 6 »	19	3.68	1.11	
Psychology of M.	*87*	*4.03*	*0.90*	Factor A: n.s.
4 x 16 ass. questions	24	4.00	0.83	Factor B: n.s.
4 x 8 »	24	3.96	0.95	A x B: n.s.
2 x 16 »	19	4.05	0.97	
2 x 8 »	20	4.15	0.88	

Factors A and B: see table 62

In appendix 6, table 74, the distributions are shown with regard to non-completers as well as completers. Non-completers are apparently less negative towards replacing assignment questions by self-check tests. No clear group patterns are discernible, however.

7.3.6 The feelings of isolation in the study situation

The variable *The feeling of isolation in the study situation* was described in section 6.3.5. The extreme values of this variable are 1 (= "Yes, to a great extent") and 5 (= "No, [I have] not at all [felt isolated]"). The outcome is shown in *table 75.*

Table 75. Results of experiments according to design 2: The feeling of isolation in the study situation, completers

Course/course version and experimental group	f	M	sd	
YES 1 (NKS)	*91*	*4.08*	*0.96*	Factor A: n.s.
8 x 12 ass. questions	24	4.16	0.80	Factor B: n.s.
8 x 6 »	20	4.19	0.93	A x B: n.s.
4 x 12 »	28	3.79	1.13	
4 x 6 »	19	4.32	0.88	
Psychology of M.	*86*	*4.12*	*1.13*	Factor A: n.s.
4 x 16 ass. questions	23	3.96	1.22	Factor B: n.s.
4 x 8 »	24	4.38	0.92	A x B: n.s.
2 x 16 »	19	4.05	1.08	
2 x 8 »	20	4.05	1.32	

Factors A and B, see table 62

The means indicate a strong tendency towards a denial of feelings of isolation in the study situation (M = 4.08 and 4.12, respectively). This tendency is even stronger than was found in courses/course versions used for experiments according to design 1 (table 50).

No significant differences between experimental groups could be proved.

The attitudes stated by non-completers are very similar to those found among completers (*appendix 6, table 76*). As was the case with courses used for experiments according to design 1, the curves are U-shaped.

7.3.7 The wish for other kinds of support in the studies than can be provided by means of pure correspondence education

The composite variable *The wish for other kinds of support in the studies . . .* was described in section 6.3.6. The support referred to is telephone and face-to-face contacts with a teacher and face-to-face contacts with fellow students. The extreme values are 3 (positive) and 15 (negative), with 9 as a neutral medium value. The outcome is shown in *table 77*.

Table 77. Results of experiments according to design 2: The wish for other kinds of support in the studies than can be provided by means of pure correspondence education, completers

Course/course version and experimental group	f	M	sd	
YES 1 (NKS)	*91*	*8.54*	*2.33*	Factor A: n.s.
8 x 12 ass. questions	24	9.17	2.30	Factor B: n.s.
8 x 6 »-	20	7.38	2.04	A x B:
4 x 12 »-	28	8.68	2.54	$0.02 < p < 0.05$
4 x 6 »-	19	8.84	2.09	η^2 for A x B = 0.04
Psychology of M.	*87*	*8.57*	*2.74*	Factor A: n.s.
4 x 16 ass. questions	24	7.83	2.78	Factor B: n.s.
4 x 8 »-	24	9.21	3.15	A x B:
2 x 16 »-	19	9.26	2.92	$0.02 < p < 0.05$
2 x 8 »-	20	8.05	2.37	η^2 for A x B = 0.06

Factors A and B: see table 62

Among the groups, slightly positive general attitudes to simultaneous contacts with teacher and fellow students is observable in the table.

No significant differences between experimental groups can be established. In both courses there is, however, an interaction between the two factors (number of submissions, and number of assignment questions per submission). The interactions are very difficult to interpret: the two extreme groups are more in favour of simultaneous contacts (Psychology of Management) or more negative to such contacts (YES 1, NKS) than are the two remaining groups.

One of the three statements on which the variable is based, was worded: "There should be an opportunity of meeting the correspondence tutor or another teacher sometimes to get some oral instruction." According to the reactions to this statement, non-completers agree with completers with regard to the wish for supplementary face-to-face contacts with a teacher (*appendix 6, table 78*).

7.4 Final test results

The results of the final tests are shown in *table 79*. In the YES 1 test, the maximum mark possible was 40, and in the test for Psychology of Management, 30. As regards YES 1 (NKS) the outcome is slightly better than was found in the Swedish versions of the same course (table 54). Also in Psychology of Management, the final test results are clearly satisfying, according to the school.

No significant differences between experimental groups were found.

Table 79. Results of experiments according to design 2: Final tests, completers

Course/course version and experimental group	f	M	sd	
YES 1 (NKS)	*92*	*30.72*	*5.48*	Factor A: n.s.
8 x 12 ass. questions	24	29.92	5.33	Factor B: n.s.
8 x 6 »	20	30.95	5.85	A x B: n.s.
4 x 12 »	29	30.45	5.11	
4 x 6 »	19	31.89	6.00	
Psychology of M.	*89*	*24.51*	*3.86*	Factor A: n.s.
4 x 16 ass. questions	25	24.36	3.68	Factor B: n.s.
4 x 8 »	24	23.63	4.02	A x B: n.s.
2 x 16 »	19	24.53	4.14	
2 x 8 »	21	25.67	3.59	

Factors A and B, see table 62

7.5 Study time variables

7.5.1 Gross study time

Table 80 shows the outcome with regard to gross study time. As is obvious from the table, the average gross study time is about 25 weeks (i.e., nearly half a year) for students of YES 1 (NKS) and approximately 17 weeks (i.e. about four months) for participants in Psychology of Management.

None of the differences between experimental groups are significant.

Table 80. Results of experiments according to design 2: Gross study time (weeks), completers

Course/course version and experimental group	f	M	sd	
YES 1 (NKS)	*99*	*25.18*	*17.94*	
8 x 12 ass. questions	24	25.29	13.36	Factor A: n.s.
8 x 6 »	20	24.70	12.14	Factor B: n.s.
4 x 12 »	32	23.69	19.40	A x B: n.s.
4 x 6 »	23	27.57	24.09	
Psychology of M.	*91*	*16.56*	*14.39*	
4 x 16 ass. questions	26	20.23	18.67	Factor A: n.s.
4 x 8 »	24	13.50	12.97	Factor B: n.s.
2 x 16 »	20	18.10	12.73	A x B: n.s.
2 x 8 »	21	14.05	10.50	

Factors A and B: See table 62

As in courses/course versions used for experiments according to design 1, the variation between individuals is extraordinarily great. *Table 81* provides the extreme values. In YES 1 (NKS), for example, the fastest completer used only one week, whereas the slowest needed nearly two years (100 weeks).

Table 81. Gross study time (weeks), experiments according to design 2: extreme values

Course/course version	Lowest value	Highest	M
YES 1 (NKS)	1	100	25.18
Psychology of M.	1	69	16.56

7.5.2 Net study time

Table 82 shows the outcome as regards net study time. For the sake of consistency (cf. table 57), the differences between experimental groups were not statistically tested, although, concerning Psychology of Management, only a slight proportion of net study time data were lost (table 28). However, based on the available data, the submission density of each experimental variant of the course/course version was estimated as the ratio of net study time to number of submissions.

It appears that, in YES 1 (NKS), the average net study time is shorter (about 54 hours) than in the two Swedish versions (around 75 hours, table 57). Calculated in study hours—as well as in pages (section 4.2.6)—Psychology of Management is the shortest of all the courses investigated: approximately 25 hours.

Table 82. Results of experiments according to design 2: Net study time (in hours), as well as estimations of submission density (calculated as net study time divided by the number of submissions), completers

Course/course version and experimental group	f	M	sd	Estimated submission density
YES 1 (NKS)	*60*	*53.97*	*50.39*	–
8 x 12 ass. questions	15	71.01	38.79	8.88
8 x 6 »	12	40.28	20.78	5.04
4 x 12 »	18	64.42	76.13	16.11
4 x 6 »	15	35.35	28.11	8.84
Psychology of M.	*82*	*25.47*	*19.83*	–
4 x 16 ass. questions	25	24.32	18.56	6.08
4 x 8 »	22	29.13	27.62	7.28
2 x 16 »	20	24.36	14.79	12.18
2 x 8 »	15	23.49	14.60	11.75

The standard deviations give an idea of the variation within the groups. The difference between the fastest and the slowest completers of YES 1 (NKS) is nothing but astounding—1 study hour as contrasted with 530. See *table 83.*

In the column "Estimated submission density" of table 82, the values as regards the four-submissions variants of Psychology of Management—6.1 and 7.3—agree well with the estimated value of submission density which was reported for this course in the pre-study (BÄATH, 1975): about 6.5 net study hours/study unit. No

Table 83. Net study time (hours), experiments according to design 2: extreme values

Course/course version	Lowest value	Highest value	M
YES 1 (NKS)	1.0	530.0	53.97
Psychology of M.	2.3	96.0	25.47

corresponding study could be made in advance with regard to the Norwegian version of YES 1. The average value obtained in the pre-study of the Swedish (traditional) version was about 13 net study hours/study unit. This could be compared with the values for the two four-submissions variants of YES 1 (NKS) in table 82: approximately 16.1 and 8.8 net study hours/study unit.

7.6 Discussion

7.6.1 Possible sources of error

The initial differences between experimental groups regarding enrolment questionnaire variables were summarized in *table 26* (section 4.7.2). As concerns experiments according to design 2, the total number of significance testings surveyed in the table were 28; 4 significant differences were found, which is slightly above a random outcome ($\alpha = 0.10$). In order to shed some light on this possible source of error, I show in *table 84* how intake variables are related to the outcome variables start and completion.

Table 84. Experiments according to design 2: Start and completion, cross-tabulated by enrolment questionnaire variables. Significant differences: * = on the 5 per cent level, ** = on the 1 per cent level

Course/course version and outcome variable	Enrolment questionnaire variable 1	2	6	7	8	9:1	9:2	9:3	10:A	10:B	10:C
YES 1 (NKS)											
Start											
Completion											
Psychology of M.											
Start		*		**							
Completion				**							

1 – Sex
2 – Age
6 – Educational level
7 – Previous correspondence study
8 – Parallel correspondence study
9:1 – "Social motivation"
9:2 – Extrinsic motivation
9:3 – Intrinsic motivation
10:A – Supposed advantages of the study form
10:B – External conditions (employer or geographical circumstances)
10:C – Difficulties to combine one's work with another study form

As is obvious from the table, significant differences were established in three cases ($\alpha = 0.05$), all concerning Psychology of Management:

Age. Older students (> 30 years) started their studies to a greater extent than younger ones.

Previous correspondence study. Students with previous experience of correspondence education both started their course and completed it to a larger extent than participants without such experience.

The findings with regard to previous correspondence study are of special interest, since one of the initial differences between the Management of Psychology groups concerns this very variable. As can be seen in table 22, the 4 x 8 assignment questions group has got proportionally more participants with previous experience of correspondence study than have the other groups. Therefore, it cannot be excluded that this bias might have affected the experimental results to some extent. This refers, in the first place, to the study perseverance variables. As is indicated in *table 85*, it might however apply also to attitude variables.

Table 85. Experiments according to design 2: Attitude variables analysed by the enrolment questionnaire variable *previous correspondence study*. Significant differences between students with and without previous experience of correspondence study: * = on the 5 per cent level, ** = on the 1 per cent level

Course/course version	Attitude variable						
	1	2	4	6	7	8	9
YES 1 (NKS)							
Psychology of M.					**		*

Attitude 1: Attitude to the course and the teaching
2: Attitude to the assignments for submission
4: Attitude to the correction of and commenting on assignments
6: Attitude to the number of assignment questions per submission
7: Attitude to replacing assignments for submission by self-check exercises
8: Feeling of isolation in the study situation
9: Wish for other kinds of support in the studies than can be provided by means of pure correspondence education

In Psychology of Management, students with previous experience of correspondence education were more negative than other students towards

- replacing assignment questions by self-check exercises
- supplementing correspondence study by simultaneous contacts with a teacher and/or fellow students.

Since students with previous experience of correspondence study completed this course to a larger extent than other students (cf. also *table 29*, section 5.2.2), it is possible that the differences shown in table 85 have affected the experimental results as regards the attitude variables in question.

7.6.2 Survey and discussion of the results

On a **descriptive** level, the results can be summarized in the following way:

1 The degree of *study perseverance* is clearly higher than in the courses/course versions used in experiments according to design 1. Nearly three fourths (74.6 per cent) of the participants started sending in solutions, and almost half of them (49.6 per cent) also completed their course. Psychology of Management shows the highest values with regard to both the study perseverance variables (77.1 per cent starters; 65.7 per cent completers).

2 The *attitudes* to the course and the teaching as a whole, to the assignments for submission and to the correction of and commenting on submitted assignments are at least as favourable as in the experiments according to design 1. The attitude towards the number of assignment questions per submission varies with the experimental treatment around a neutral medium value. The attitude to replacing assignment questions by self-check exercises is, on an average, very negative. (However, it should be recalled that for three of the four groups in each experiment substantial proportions of the assignment questions had already been replaced by self-check exercises. Thus, in these groups students were unfavourable towards *further* replacement of assignment questions by self-check tests.)—A clear majority of the responding students deny having felt isolated in their study situation. Nevertheless, a slightly favourable general attitude is perceptible as regards other kinds of support in the studies than can be provided by means of pure correspondence education. As concerns face-to-face contacts with a teacher, this attitude is clearly positive.

3 According to the assessment of the schools, the *final test results* are satisfying.

4 In YES 1 (NKS), the average *study time* is shorter than in the Swedish versions of the same course. Psychology of Management shows the shortest study time of all the courses/course versions investigated: just below four months (gross study time), and about 25 hours (net study time), respectively. As in experiments according to design 1, the individual variations are very great, concerning YES 1 (NKS) strikingly so.

With regard to attitudes, final test results, and study time, the above survey applies only to the *completers*. Largely, the attitudes reported by the non-completing students are in agreement with those of the completers, although slightly less favourable, in general. However, due to the considerable loss of dropout questionnaire data, the figures concerning the attitudes of the non-completers should be interpreted with great care. As regards study perseverance, the comparatively good values for psychology of Management can probably—to a great extent—be referred to the fact that this course is short and vocationally oriented. It is more difficult to explain why the degree of study perseverance is higher in the Norwegian version of YES 1 than in the two Swedish versions of the same course.

The **experimental** tests were performed as two-way analyses of variance. One of the factors was **number of submissions**, representing submission density. As for this factor, one significant difference was found, regarding the attitude to the scrutiny of submitted assignments in YES 1 (NKS). Here, the high-density groups (8 submissions) were more favourable than were the groups with regular submission density.

The other factor, **number of assignment questions per submission**, represents the main problem of experiments according to design 2. The outcome with regard to this variable is summarized in *table 86*.

In all, 22 significance tests were performed concerning this factor. Only one significant difference was found. This result might be attributable to mere chance ($\alpha = 0.05$). Nevertheless, the significant difference in question makes good sense: In Psychology of Management, the groups with a low number of assignment questions per submission (i.e., 8) are more in favour of increasing this number than are the groups with a regular number of assignment questions per submission.

Consequently, the hypotheses concerning number of assignment questions per submission must, on the whole, be rejected. It appears that the replacement of a substantial part (50 and even 75 per cent) of the assignment questions by self-check exercises—as made in these two courses/course versions—had almost no appreciable

Table 86. Survey of experimental results with regard to number of assignment questions per submission, experiments according to design 2. Significant difference: * =on the 5 per cent level

Course/course version	Outcome variables										
	Start	Completion	Attitude							Final test	Gross study time
			1	2	4	6	7	8	9		
YES 1 (NKS) Psychology of M.						*					

Attitude 1: Attitude to the course and the teaching
2: Attitude to the assignments for submission
4: Attitude to the correction of and commenting on students' assignments
6: Attitude to the number of assignment questions per submission
7: Attitude to replacing assignment questions by self-check exercises
8: Feeling of isolation in the study situation
9: Wish for other kinds of support in the studies than can be provided by means of pure correspondence education

effects, neither unfavourable nor favourable, on study perseverance, attitudes, final test results or study time. As for Psychology of Management, however, there is some uncertainty about the internal validity of the experimental results, due to the initial difference between groups as concerns previous experience of correspondence study.

In *chapter 9* I will return to the experiments according to design 2 for a discussion of the theoretical and practical implications of these findings.

8 Results of experiments according to design 3

8.1 Introduction

The experiments that were carried through according to design 3 (4.5.3) refer to problem area 3, the possibility of replacing the routine parts of the traditional postal two-way communication between student and correspondence tutor by computer-assisted two-way communication. In two cases, the results of two different versions of the same course—one traditional and one computer-assisted—were compared:

YES 1 (Hermods)

Psychology, General Course.

One more experiment of the same type was planned (Physics, Elementary Course, Hermods) but had to be cancelled, due to an unexpectedly low number of course applicants (cf. table 10, section 4.2.1).

The results of the experiments according to design 3 will be presented in the same way as was followed in chapters 6 and 7. However, since the outcome with regard to YES 1 (H) and Psychology, General Course was already described in chapter 6 as concerns most of the variables which have been studied in the design 3 experiments, the results will be presented more briefly in this chapter, concentrating on the experimental comparisons. In the tables only means and frequencies will be provided besides the data from the statistical testings.

Differences between experimental groups were tested by means of two-way analyses of variance (significance level: $\alpha = 0.05$). When a significant difference was proved, the strength of the relationship, η^2, was also computed.

8.2 Study perseverance variables

8.2.1 Start

Table 87 shows the proportions of starters for the versions and variants of the two courses. The proportions are computed as means on a scale from 0 (= non-starter) to 1 (= starter). Evidently, the inclination to start is more accentuated in the computer-assisted versions than in the traditional ones. In both cases, the differences are significant. As indicated by the η^2 values for factor B, the relationships are weak, however.

It can also be noted that the outcome as regards both the courses shows a significant difference between the levels of factor A, number of submissions (cf. table 39, section 6.2.1). Still, also in this case the relationships are weak.

8.2.2 Completion

The proportions of completers and sizes of groups as shown in *table 88* diverge to some extent from what was reported in table 40 with regard to YES 1 (H) and

Table 87. Results of experiments according to design 3: Start. (Percentages computed as means; within brackets: group sizes on which the percentages are calculated. Thus, e.g., 0.68 (79) should be read "68 per cents of 79", i.e. 54 students)

Course and type of two-way communication	Number of submissions 8	4	2	Σ	
YES 1 (H)					
Comp.-ass.	0.68	0.70	0.40	0.61	Factor A:
	(79)	(77)	(65)	(221)	$0.001 < p < 0.01$
Traditional	0.47	0.55	0.46	0.50	Factor B:
	(58)	(85)	(67)	(210)	$0.02 < p < 0.05$
Σ	0.59	0.62	0.43	0.55	A x B: n.s.
	(137)	(162)	(132)	(431)	η^2 for A: 0.03
					η^2 for B: 0.01
Psychology, G.C.					
Comp.-ass.	0.72	0.54	0.51	0.59	Factor A: < 0.001
	(71)	(74)	(69)	(214)	Factor B: < 0.001
Traditional	0.58	0.38	0.30	0.42	A x B: n.s.
	(65)	(61)	(76)	(202)	
Σ	0.65	0.47	0.40	0.50	η^2 for A: 0.04
	(136)	(135)	(145)	(416)	η^2 for B: 0.03

Factor A: number of submissions
Factor B: type of two-way communication

Psychology, General Course. As has already been mentioned in section 4.6.2, in order to equalize the experimental groups (traditional–computer-assisted) 6 completers of

Table 88. Results of experiments according to design 3: Completion. (Percentages computed as means; group sizes given as in table 87.)

Course and type of two-way communication	Number of submissions 8	4	2	Σ	
YES 1 (H)					
Comp.-ass.	0.28	0.32	0.26	0.29	Factor A: n.s.
	(79)	(77)	(65)	(221)	Factor B: n.s.
Traditional	0.14	0.22	0.36	0.24	A x B: n.s.
	(58)	(85)	(67)	(210)	
Σ	0.22	0.27	0.31	0.27	
	(137)	(162)	(132)	(431)	
Psychology, G.C.					
Comp.-ass.	0.34	0.27	0.38	0.33	Factor A: n.s.
	(71)	(74)	(69)	(214)	Factor B: < 0.001
Traditional	0.20	0.15	0.16	0.17	A x B: n.s.
	(65)	(61)	(76)	(202)	
Σ	0.27	0.21	0.26	0.25	η^2 for B: 0.03
	(136)	(135)	(145)	(416)	

Factors A and B: see table 87

the computer-assisted Swedish version of YES 1 were regarded as non-completers.[1] To the same end, 6 completers of the traditional version of Psychology, General Course were transferred to the group of non-completers.[2]

As can be seen in table 88, both the computer-assisted versions show a greater proportion of completers than the traditional versions. Yet, the difference is statistically significant only in the case of Psychology, General Course. In this course, the proportion of completers in the computer-assisted version is nearly twice as great as in the traditional version; nevertheless, the relationship is weak ($\eta^2 = 0.03$).

As can be seen, no significant differences were established as concerns the main experimental variable, type of two-way communication. However, regarding factor A, the combined two-submissions groups of YES 1 (H) show a less positive attitude towards the course and the teaching than the two groups with higher submission density, the difference being statistically significant. (Cf. table 41, section 6.3.1.)

Attitudes among non-completers are indicated in *tables 42* and *43* (*appendix 6*).

Table 89. Results of experiments according to design 3: Attitude to the course and the teaching, completers. (Means; group sizes within brackets)

Course and type of two-way communication	Number of submissions 8	4	2	Σ	
YES 1 (H)					
Comp.-ass.	19.14 (22)	19.26 (23)	21.35 (17)	19.79 (62)	Factor A: $0.02 < p < 0.05$
Traditional	18.20 (5)	19.17 (12)	21.14 (14)	19.90 (31)	Factor B: n.s.
Σ	18.96 (27)	19.23 (35)	21.26 (31)	19.83 (93)	A x B: n.s. η^2 for A: 0.08
Psychology, G.C.					
Comp.-ass.	19.65 (23)	21.40 (20)	20.88 (26)	20.62 (69)	Factor A: n.s.
Traditional	21.08 (12)	22.00 (8)	21.58 (12)	21.50 (32)	Factor B: n.s.
Σ	20.14 (35)	21.57 (28)	21.11 (38)	20.90 (101)	A x B: n.s.

Factors A and B: see table 87

8.3 Attitude variables

Since all the following outcome tables in this chapter (89–96) refer exclusively to completers, the same reduction of the number of completers as was explained in the previous section will be made here. In addition, there is a varying minor data loss, due to (1) non-return of final questionnaires and/or final tests (cf. table 28), (2) non-response to certain items in the final questionnaire, and (3) a specific loss of data concerning gross study time (mainly as regards YES 1, H, traditional).

8.3.1 Attitudes to the course and the teaching

The variable *attitude to the course and the teaching* was described in section 6.3.1. It varies from 9 (positive) to 43 (negative), with 26 as a neutral medium value. The outcome with regard to this variable is shown in *table 89*.

1) 5 individuals in the eight-submissions group, 1 individual in the four-submissions group

2) 2 participants in the eight-submissions group, 1 in the four-submissions group, and 3 in the two-submissions group

8.3.2 Attitudes to the assignments for submission

The variable *attitude to the assignments for submission* was described in section 6.3.2. It varies from 11 (positive) to 55 (negative), with 33 as a neutral medium value. *Table 90* shows the outcome with regard to experiments according to design 3.

Obviously, no significant differences can be found between groups with different kinds of two-way communication. Both groups are clearly positive towards the assignments for submission.

Table 45 (*appendix 6*) provides an indication of the attitudes among non-completers.

Table 90. Results of experiments according to design 3: Attitude to the assignments for submission, completers. (Means; group sizes within brackets)

Course and type of two-way communication	Number of submissions 8	4	2	Σ	
YES 1 (H)					
Comp.-ass.	20.14 (21)	19.95 (20)	22.12 (17)	20.66 (58)	Factor A: n.s. Factor B: n.s.
Traditional	19.60 (5)	22.27 (11)	22.15 (13)	21.76 (29)	A x B: n.s.
Σ	20.04 (26)	20.77 (31)	22.13 (30)	21.02 (87)	
Psychology, G.C.					
Comp.-ass.	20.62 (24)	20.47 (19)	20.12 (26)	20.39 (69)	Factor A: n.s. Factor B: n.s.
Traditional	19.27 (11)	20.87 (8)	23.08 (12)	21.16 (31)	A x B: n.s.
Σ	20.20 (35)	20.59 (27)	21.05 (38)	20.63 (100)	

Factors A and B: see table 87

8.3.3 Attitudes to the type of assignment questions

We asked:

> Which type of *assignment questions* would you prefer, if you could choose: "open" questions–that is, questions to which you have to provide or formulate the answers yourself–or "multiple choice" questions–that is, questions to which you have to select the correct answers from those provided?

The responses suggested run along a scale from 1 = "I would certainly choose 'ordinary' questions" to 5 = "I would certainly choose multiple choice questions".

As can be inferred from the table, there is a tendency among the participants to favour the kind of assignment questions that they have had in their course. Thus, students who have completed the computer-assisted versions tend to prefer multiple-choice questions, whereas those who have worked through the traditional versions are less positive towards questions of this kind. The difference is significant only in YES 1 (H). Here, however, the value of η^2 (0.15) indicates a comparatively strong relationship.

This question was not included in the dropout questionnaire.

Table 91. Results of experiments according to design 3: Attitude to the type of assignment questions, completers. (Means; group sizes within brackets)

Course and type of two-way communication	Number of submissions 8	4	2	Σ	
YES I (H)					
Comp.-ass.	3.64	3.61	3.47	3.58	Factor A: n.s.
	(22)	(23)	(17)	(62)	Factor B:
Traditional	2.60	2.62	2.71	2.66	$p < 0.001$
	(5)	(13)	(14)	(32)	A x B: n.s.
Σ	3.44	3.25	3.13	3.27	η^2 for B: 0.15
	(27)	(36)	(31)	(94)	
Psychology, G.C.					
Comp.-ass.	3.50	3.50	3.46	3.49	Factor A: n.s.
	(24)	(20)	(26)	(70)	Factor B: n.s.
Traditional	3.00	3.50	3.08	3.15	A x B: n.s.
	(13)	(8)	(12)	(33)	
Σ	3.32	3.50	3.34	3.38	
	(37)	(28)	(38)	(103)	

Factors A and B: see table 87

8.3.4 Attitudes to the correction of and commenting on students' assignments

The variable *attitude to the correction of . . .* was described in section 6.3.3. It varies between 2 (positive) and 10 (negative), with 6 as a neutral medium value. *Table 92* surveys the outcome as regards this variable.

Table 92. Results of experiments according to design 3: Attitude to the correction of and commenting on students' assignments, completers. (Means; group sizes within brackets)

Course and type of two-way communication	Number of submissions 8	4	2	Σ	
YES I (H)					
Comp.-ass.	2.64	3.00	2.53	2.74	Factor A: n.s.
	(22)	(22)	(17)	(61)	Factor B:
Traditional	3.20	3.38	3.69	3.48	$0.001 < p < 0.01$
	(5)	(13)	(13)	(31)	A x B: n.s.
Σ	2.74	3.14	3.03	2.99	η^2 for B: 0.08
	(27)	(35)	(30)	(92)	
Psychology, G.C.					
Comp.-ass.	3.13	3.25	2.96	3.10	Factor A: n.s.
	(24)	(20)	(26)	(70)	Factor B:
Traditional	4.08	4.00	4.42	4.19	$0.001 < p < 0.01$
	(12)	(8)	(12)	(32)	A x B: n.s.
Σ	3.44	3.46	3.42	3.44	η^2 for B: 0.09
	(36)	(28)	(38)	(102)	

Factors A and B: see table 87

Although all the groups are clearly positive to the school's correction of and commenting on their assignments, it is evident that the groups with computer-assisted tuition are more positive than those with traditional two-way communication. For both courses, the differences are significant. Judging from the values of η^2, the relationships are moderately strong (0.08 and 0.09, respectively). Thus, it appears that the experimental variation with regard to type of two-way communication has affected the participants' attitudes to the correction of and commenting on their assignments to a more than negligible extent.

An indication of the attitudes among non-completers is provided in *table 47* (*appendix 6*).

8.3.5 The feelings of isolation in the study situation

The variable *the feeling of isolation in the study situation* was described in section 6.3.5. Its extreme values are 1 ("Yes, to a great extent") and 5 ("No, [I have] not at all [felt isolated]"). The outcome is presented in *table 93*.

No significant differences between groups can be proved. Apparently, the computer-assisted two-way communication did not make students feel isolated any more than the traditional tuition.

Table 51 (*appendix 6*) indicates the attitudes among non-completers.

Table 93. Results of experiments according to design 3: The feeling of isolation in the study situation, completers. (Means; group sizes within brackets)

Course and type of two-way communication	Number of submissions 8	4	2	Σ	
YES 1 (H)					
Comp.-ass.	3.77	3.41	3.94	3.69	Factor A: n.s.
	(22)	(22)	(17)	(61)	Factor B: n.s.
Traditional	4.00	3.77	3.00	3.47	A x B: n.s.
	(5)	(13)	(14)	(32)	
Σ	3.81	3.54	3.52	3.61	
	(27)	(35)	(31)	(93)	
Psychology, G.C.					
Comp.-ass.	3.26	3.40	3.65	3.45	Factor A: n.s.
	(23)	(20)	(26)	(69)	Factor B: n.s.
Traditional	3.54	2.87	3.33	3.30	A x B: n.s.
	(13)	(8)	(12)	(33)	
Σ	3.36	3.25	3.55	3.40	
	(36)	(28)	(38)	(102)	

Factors A and B: see table 87

8.3.5 The wish for other kinds of support in the studies than can be provided by means of pure correspondence education

The variable *the wish for other kinds of support in the studies . . .* was described in section 6.3.6. It summarizes responses to statements about telephone or face-to-face contacts with a teacher and face-to-face contacts with fellow students. The extreme values of this variable are 3 (positive to such contacts) and 15 (negative), with 9 as a neutral medium value.

The outcome is shown in *table 94*. As can be seen, the results agree with what was found concerning the previous variable. In neither of the two courses is there a

stronger need for simultaneous contacts in groups which have had computer-assisted two-way communication than in the traditionally tutored groups. Rather, the tendency is the reverse. The differences are non-significant, however.

Table 94. Results of experiments according to design 3: The wish for other kinds of support in the studies than can be provided by means of pure correspondence education, completers. (Means; group sizes within brackets)

Course and type of two-way communication	Number of submissions 8	4	2	Σ	
YES 1 (H)					
Comp.-ass.	8.91	8.45	8.31	8.58	Factor A: n.s.
	(22)	(22)	(16)	(60)	Factor B: n.s.
Traditional	8.40	7.82	7.31	7.69	A x B: n.s.
	(5)	(11)	(13)	(29)	
Σ	8.81	8.24	7.86	8.29	
	(27)	(33)	(29)	(89)	
Psychology, G.C.					
Comp.-ass.	7.62	8.55	8.12	8.07	Factor A: n.s.
	(24)	(20)	(26)	(70)	Factor B: n.s.
Traditional	8.08	7.37	7.83	7.82	A x B: n.s.
	(13)	(8)	(12)	(33)	
Σ	7.78	8.21	8.03	7.99	
	(37)	(28)	(38)	(103)	

Factors A and B: see table 87

The attitudes of some non-completers to one of the statements on which the sum variable is based, can be seen in *table 53* (*appendix 6*).

8.4 Final test results

The results of the final tests for YES 1 and Psychology, General Course are shown in *table 95*. In both tests 40 points is a maximum. As was described in section 4.6.1, each test contains an equal share of multiple choice questions and free answer questions.

No significant differences between experimental groups were found.

In a separate analysis, I studied the results of the two different parts of which the final tests are composed – the one with multiple choice questions and the other with free answer questions. No differences were found. Groups which had had computer-assisted tuition (based on multiple choice questions) achieved equally well on both parts of the tests, and so did groups having got traditional two-way communication.

8.5 Study time variables

8.5.1 Gross study time

The variable *gross study time* was described in section 6.5.1. The outcome is shown in *table 96*.

Table 95. Results of experiments according to design 3: Final tests, completers. (Means; group sizes within brackets)

Course and type of two-way communication	Number of submissions 8	4	2	Σ	
YES 1 (H)					
Comp.-ass.	28.76 (21)	27.04 (23)	27.00 (16)	27.63 (60)	Factor A: n.s. Factor B: n.s.
Traditional	31.80 (5)	28.50 (12)	24.93 (14)	27.42 (31)	A x B: n.s.
Σ	29.35 (26)	27.54 (35)	26.03 (30)	27.56 (91)	
Psychology, G.C.					
Comp.-ass.	20.37 (24)	25.00 (20)	23.13 (23)	22.70 (67)	Factor A: n.s. Factor B: n.s.
Traditional	19.77 (13)	20.29 (7)	21.17 (12)	20.41 (32)	A x B: n.s.
Σ	20.16 (37)	23.78 (27)	22.46 (35)	21.96 (99)	

Factors A and B: see table 87

As concerns YES 1 (H) we see again the differences between groups with varying submission density (factor A) that were found according to table 55 (section 6.5.1). With regard to the type of two-way communication (factor B), the results seem to take diverging directions. However, the difference is statistically significant only in

Table 96. Results of experiments according to design 3: Gross study time, completers. (Weeks, means; group sizes within brackets)

Course and type of two-way communication	Number of submissions 8	4	2	Σ	
YES 1 (H)					
Comp.-ass.	29.00 (22)	30.20 (25)	20.18 (17)	27.12 (64)	Factor A: $0.001 < p < 0.01$
Traditional	54.17 (6)	19.27 (15)	20.24 (19)	25.05 (40)	Factor B: n.s. A x B: $p = 0.001$
Σ	34.39 (28)	26.10 (40)	20.31 (36)	26.33 (104)	η^2 for A: 0.10 η^2 for A x B: 0.13
Psychology, G.C.					
Comp.-ass.	26.79 (24)	25.60 (20)	20.96 (26)	24.29 (70)	Factor A: n.s. Factor B: $0.001 < p < 0.01$
Traditional	42.87 (15)	32.30 (10)	33.64 (14)	36.85 (39)	A x B: n.s.
Σ	32.97 (39)	27.83 (30)	25.40 (40)	28.78 (109)	η^2 for B: 0.07

Factors A and B: see table 87

Psychology, General Course, where students with computer-assisted two-way communication completed their course faster than did participants in the traditional groups. The strength of the relationship is rather modest, however ($\eta^2 = 0.07$).

In addition, we find in YES 1 a comparatively strong interaction effect ($\eta^2 = 0.13$) between number of submissions and type of two-way communication.

8.5.2 Net study time

Due to the considerable loss of data as concerns net study time, no comparisons were made with regard to this variable. Therefore, no results are shown in this section. In table 57 (section 6.5.2) data concerning YES 1 (H) and Psychology, General Course were reported.

8.6 Discussion

8.6.1 Possible sources of error

The initial differences between experimental groups regarding enrolment questionnaire variables were summarized in *table 26* (section 4.7.2). As concerns experiments according to design 3, the total number of significance testings surveyed in the table was 28; 5 significant differences were found, four of them referring to YES 1 (H). In order to shed some light on this possible source of error, I show in *table 97* how intake variables are related to the outcome variables start and completion.

In all, nine significant differences were found.

Despite the appreciable number of significant differences, a comparison shows that there is no correspondence between tables 26 and 97, with regard to experiments according to design 3. In no case does an initial difference as regards one of the enrolment questionnaire variables coincide with an established relationship between this variable and any of the outcome variables start and completion. This makes it likely that the differences summarized in table 26 are negligible, as far as the experiments according to design 3 are concerned.

In *table 29*, initial differences between completers and non-completers were summarized. In order to give an idea of the extent to which these initial differences may have affected the outcome with regard to attitudes, I show in *table 98* how the four intake variables in question are related to the attitude variables.

In four cases significant differences were found, all referring to Psychology, General Course:

- Older students were more positive towards the course and the teaching as a whole than younger students
- Older students were also more positive towards the correction of and commenting on their submitted assignments than younger students
- Students with previous experience of correspondence education were less positive to face-to-face support than participants without such experience
- Students who were more orientated towards extrinsic goals tended to feel less isolated in their study situation than students with a lower degree of extrinsic motivation (although the latter category completed their course to a larger extent, as was previously shown).

Thus, as concerns Psychology, General Course, it appears that the outcome regarding four of the attitude variables—overall attitude to the course and the teaching, attitude to the scrutiny, feeling of isolation, and wish for other kinds of support—is not entirely representative of the population but only of those students who completed the course.

Table 97. Experiments according to design 3: Start and completion, cross-tabulated by enrolment questionnaire variables. Significant differences: * = on the 5 per cent level, ** = on the 1 per cent level, *** = on the 0.1 per cent level

Course and outcome variable	Enrolment questionnaire variable										
	1	2	6	7	8	9:1	9:2	9:3	10:A	10:B	10:C
YES I (H)											
Start	***	*					*				
Completion				*	*						
Psychology, G.C.											
Start				*							
Completion		*		**			*				

Enrolment questionnaire variable

1	– Sex	9:3	– Intrinsic motivation
2	– Age	10:A	– Supposed advantages of the study form
6	– Educational level		
7	– Previous correspondence study	10:B	– External conditions (employer or geographical circumstances)
8	– Parallel correspondence study		
9:1	– "Social motivation"	10:C	– Difficulties to combine one's work with another study form
9:2	– Extrinsic motivation		

Table 98. Experiments according to design 3: Attitude variables analysed by a number of enrolment questionnaire variables. Significant differences: * = on the 5 per cent level, ** = on the 1 per cent level

Course and attitude variable	Enrolment questionnaire variables			
	Age	Previous corr. study	Parallel corr. study	Extrinsic motivation
YES I (H)				
Attitude 1				
2				
3				
4				
8				
9				
Psychology, G.C.				
Attitude 1	*			
2				
3				
4	*			
8				**
9		**		

Attitude 1: Attitude to the course and the teaching
2: Attitude to the assignments for submission
3: Attitude to the type of assignment questions
4: Attitude to the correction of and commenting on students' assignments
8: Feeling of isolation in the study situation
9: The wish for other kinds of support in the studies than can be provided by means of pure correspondence education

8.6.2 Survey and discussion of the results

With one exception, the **descriptive** data were reported in chapter 6, sections 6.2–6.5, and summarized in section 6.6.2. The exception is the attitude to the type of assignment questions. This tended to vary with the participants' experiences of their studies in such a way that students of the computer-assisted versions stated that they would prefer multiple choice questions, whereas students of the traditional course versions were less in favour of such questions.

The **experimental** tests were performed as two-way analyses of variance, one of the factors being submission density, defined as **number of submissions**. Four significant differences were found with regard to this factor. These refer to the variables

- start (both courses)
- attitude to the course and the teaching (YES 1, H)
- gross study time (YES 1, H).

The outcome as concerns gross study time might be considered identical with what was found in chapter 6. The result as regards start reflects the difference between experimental groups of YES 1 (H, computer-assisted) that was reported in the same chapter. In the experiments according to design 1, no significant differences were found regarding the overall attitudes to the course and the teaching. Still, when the two versions of YES 1 (H) are combined, as was the case in experiments according to design 3, it appears that the low-density group is less positive to the course and the teaching than the other groups.

The experimental results concerning the factor **type of two-way communication**—the independent variable which represents the main problem in experiments according to design 3—are summarized in *table 99*.

Table 99. Survey of experimental results with regard to type of two-way communication, experiments according to design 3. Significant differences: * =on the 5 per cent level, ** =on the 1 per cent level, *** =on the 0.1 per cent level

Course/course version	Outcome variables										
	Start	Completion	Attitude							Final test	Gross study time
			1	2	3	4	8	9			
YES 1 (H)	*				***	**					
Psychology, G.C.	***	***				**					**

Attitude 1: Attitude to the course and the teaching
2: Attitude to the assignments for submission
3: Attitude to the type of assignment questions
4: Attitude to the correction of and commenting on students' assignments
8: Feeling of isolation in the study situation
9: The wish for other kinds of support in the studies than can be provided by means of pure correspondence education

In all, 20 statistical tests of significance were performed as regards this factor. Seven significant differences were found. This is considerably more than could be expected by mere chance, as a result of testings on the 5 per cent level.

In six cases out of seven, the significant differences take one and the same direction. Students with *computer-assisted* two-way communication

- started submitting assignments to a greater extent than students with traditional correspondence tuition (both courses)

- completed their course to a greater extent than students with traditional tuition (Psychology, General Course)
- adopted more favourable attitudes to the correction of and commenting on their submitted assignments than did students with traditional tuition (both courses)
- completed their course within a shorter time (gross study time) than did students with traditional two-way communication (Psychology, General Course).

The outcome is in accordance with what has been reported from previous investigations – in most cases not experimental, however – e.g., BRITTAIN (1973), BÅATH & MANSSON (1977), LAMBERT (1977), and SCHÜMER (1978, 1979).

The remaining significant difference refers to the attitude to the type of assignment questions (YES 1, H). Here, students who had worked with assignment questions of the free answer type stated that they prefer this type, whereas students having had multiple choice questions apparently prefer that type. Also this finding is consistent with what could be expected from previous (non-experimental) studies, e.g. GRAHM (1969) and BÅATH & MANSSON (1977). (Cf. section 2.5.2.)

By way of summary, several of the hypotheses related to experiments according to design 3 were confirmed with regard to one or both of the courses: *Various types of two-way communication in correspondence education (computer-assisted–traditional) lead to differences with regard to start (both courses), completion, attitude to the type of assignment questions, attitude to the correction of and commenting on students' assignments (both courses), and gross study time.*

The third main problem was worded in the following way: "Could a system for computer-assisted two-way communication in correspondence education provide as good effects as traditional two-way communication with regard to study perseverance, attitudes to the studies, achievements, and time needed for the studies?" The results now reported seem to have provided an unequivocal answer to this question. Under the experimental conditions arranged, and with the measures of outcome used, the system for computer-assisted tuition has proved to work not only as well as the traditional two-way communication but even better.

In the following chapter, I will return to the experiments according to design 3 for a discussion of the theoretical and practical implications of this outcome.

9 Concluding discussion

9.1 Submission density

9.1.1 Submission density in relation to the functions of postal two-way communication in correspondence education

Within the research project "Two-way communication in correspondence education" we have postulated that assignments for submission and postal two-way communication, based on such assignments, can fulfil important functions in correspondence education (BÅÅTH & FLINCK, 1973; BÅÅTH, 1976b; BÅÅTH & WÅNGDAHL, 1976). Provided that this assumption is valid, it would seem reasonable to hypothesize that the density of postal contacts or—stated otherwise—the *submission density* could be an essential instructional variable in correspondence study.

Most probably, the submission occasions at the end of each study unit serve as sub-goals, i.e. easily discernible steps on the path towards the terminal goal of the course. This may promote students' *motivation* (cf. 2.5.1). Other probable motivational factors related to the assignments for submission and the postal tuition are

- the very working on the assignment problems, which can be stimulating in itself, and
- the experience of positive effects which may follow from a successful result and/or be induced by the tutor's supporting, encouraging or praising comments.

In all likelihood, the assignments and the postal two-way communication also further *feedback* and other didactic functions, such as structuring the material and helping the students to concentrate on essentials, survey and grasp the whole, revise the course, and apply and transfer the new knowledge (cf. table 2, section 2.5.1).

In addition, the postal contacts might *counteract possible feelings of isolation* in the study situation and promote students' integration into the social system of the correspondence school (cf. MALLEY ET AL, 1976).

Thus, *high* submission density, i.e. frequent postal contacts, could be assumed (1) to entail stronger motivational effects than low submission density, (2) to yield more efficient feedback and better didactic effects on the whole, and also (3) to counteract possible feelings of isolation more strongly than infrequent postal contacts. If so, these effects should be possible to trace in terms of study perseverance, attitudes, final test results and/or study time.

9.1.2 The experimental result with regard to start, and some implications

However, the outcome of the experiments on varied submission density, dealt with in chapter 6, hardly give unequivocal support to the assumptions reviewed in the previous section. The only obvious exception refers to the outcome variable *start*. In five experiments out of six, a higher degree of submission density resulted in a greater proportion of starters—i.e. students who had started to submit assignments for scrutiny. Evidently, this is an effect of the sub-goal function of the submission occasions. Higher submission density means shorter study units and, consequently, a shorter way to the first sub-goal—the first submission occasion.

Of course, this finding should not be overestimated. In spite of their greater tendency to start, students in the high-density groups did not complete their courses to a larger extent, which would have been a considerably more important result—from a theoretical as well as from a practical point of view.

Nor should the finding be underrated, however. In pure correspondence education, the postal contacts based on assignments for submission are—very often—the only contacts whatsoever between the students and the school. Therefore, if a student *starts* sending in answers, it should be much easier to give him or her adequate help than if he/she does not start. It follows that, in this respect, high submission density should be preferable to infrequent contacts.

In practice, a compromise is clearly conceivable. Since the only fairly general effect of higher submission density refers to the first study unit of a course, some minimum advice to course editors might be worded like this: *At least, make the* **first** *study unit of a correspondence course comparatively short.*

9.1.3 Could other experimental arrangements have provided more clear-cut effects?

The largely insignificant effects as to the remaining outcome variables—i.e., with regard to completion, attitudes, final test results and to some extent also gross study time—should be interpreted with some care. It is possible that, in one respect, the experimental arrangements favoured the medium-density variants (that is, the four-submissions variants, in the Swedish courses). Students allocated to these variants received a course with precisely the number of submissions they had expected (from reading the prospectus of the school, or otherwise getting information about the course), whereas students obtaining the high- or low-density variants may have reacted more or less unfavourably towards the change of the number of submissions. The responses to the final questionnaire statements on submission density (6.3.4, table 48) might be interpreted this way.

It is also possible that the experimental design has, in one respect, removed the experiments from the reality to which they refer. If so, it might have diminished our possibilities to obtain clear-cut differences between experimental groups. In the experiments according to design 1, the total number of assignment questions was kept constant in all the experimental variants of a course (cf. table 12). The reason for this arrangement was that we felt it ethically questionable to manipulate the experimental conditions in such a way as to give certain groups of students a kind of tuition which could be assumed to be clearly inferior to the regular one which they had applied for. This would have been the case if we had simply cut off half and three fourths, respectively, of the assignment questions—cf. the hypothetical example in *table 100*—without replacing (as in experiments according to design 2) these assignment questions by corresponding self-check exercises with model answers and comments within the teaching material.

Table 100. A hypothetical example of how the experiments according to design 1 could have been arranged in a more realistic—but ethically more questionable—way. (Table 12, section 4.2.2, shows the actual arrangement)

Experimental variant	Number of submissions		Assignment questions per submission		Sum total of assignment questions
Variant A	8	x	12	=	96
Variant B	4	x	12	=	48
Variant C	2	x	12	=	24

Probably, the fictitious arrangement in table 100 corresponds better to what often happens when a correspondence school considers it necessary to decrease the number of submissions in a course: The total number of assignment questions is also reduced—sometimes drastically.

In no way can the results obtained in this study be used to support such reductions as are illustrated in table 100. On the contrary, it is possible that an experimental arrangement of this kind had yielded more clear-cut results than the one actually used.

9.1.4 To what extent did the postal two-way communication actually fulfil the functions implied?

Provided that the assumptions about the potential functions of assignments for submission and postal two-way communication (9.1.1) are valid—which both empirical studies and theoretical considerations make highly probable—it might be questioned to what extent the assignments and the postal contacts actually fulfil these functions in the courses investigated. If they do not fulfil them completely, this could have contributed to the small experimental effects.

In all the experiments, the students state markedly favourable attitudes to the assignments for submission, as well as to the correction of and commenting on their solutions (6.3.2, 6.3.3). As concerns the assignments, the positive attitudes refer to all the suggested functions, with particular emphasis on the motivational aspects (cf. *tables 44* and *45*, *appendix 6*). This result is in accordance with previous studies, GRAHM (1969) in particular. However, the attitudes to the correction and commenting are more positive than what could be expected, considering the results of several earlier investigations. It should yet be underlined that the result is based only on answers from the completers and from the comparatively few non-completers who returned the dropout questionnaire, answering the questions on the two-way communication element of their course.

Despite the responding students' markedly positive attitudes to the correction of and commenting on their solutions, it is likely that the two-way communication of the courses investigated does not completely fulfil such demands on personal, individualizing and motivationally stimulating mail contacts as can be extracted from the classical literature on correspondence education and appear desirable from a number of theoretical points of view (BÅÅTH & WÄNGDAHL, 1976; BÅÅTH, 1979). In three of the courses/course versions, the tuition was of the computer-assisted type. However good this tuition may be, it is by necessity restricted with regard to flexibility and possibility to establish personal student-tutor contacts. Nevertheless, the participants' attitudes to the correction and commenting are *more* positive in the computer-assisted versions than in the traditional versions where the students were in direct mail communication with a tutor—a rather remarkable finding. It should also be observed that the students of the computer-assisted versions felt no more isolated in their study situation than did the students of the traditional versions. The opposite might have been expected if the tutors of the latter versions had managed to establish personal contacts with their students.

Another indication that the two-way communication did not completely fulfil the functions postulated might be found in the low completion rates of all the experimental course variants, even those with more frequent tutor-student contacts.

9.1.5 Are the results in favour of *low* submission density?

As we have seen, the high-density effects turned out to be modest. It must be added, however, that the same applies to the low-density effects, to an even higher degree.

Certain considerations might indicate that it would be desirable to have *few* submission occasions in correspondence courses. Frequent assignment submissions

could be felt burdensome and could strengthen some students' test anxiety; they might even hamper highly autonomous students (cf. MOORE, 1973, 1975, 1977; section 2.2.4). The results of the only experiment on submission density, previously carried out (FLEECE, 1957), are in line with such considerations.

However, the outcome of the present study yields practically no support at all to such a view. Certainly, in two experiments, lower submission density correlated with shorter gross study time and in one of these experiments with a higher completion rate as well. However, the majority of the significant differences took the opposite direction.

9.2 Assignments for submission partly replaced by self-check exercises

9.2.1 Functions of self-check exercises, as compared with functions of assignments for submission

As has been mentioned before, the research staff initially supposed that assignments for submission and postal two-way communication based on such assignments could serve important instructional functions from the viewpoint of learning, motivation, and social psychology. If this assumption is valid, it may appear doubtful to reduce, substantially, the number of assignment questions in a course in favour of self-check exercises in the teaching material. This opinion is apparently adopted by a majority of European correspondence schools belonging to the organizations EHSC or CEC, as well as by the Open University – judging from their answers to a question on the possibility to replace a substantial amount of assignment questions by self-check exercises (BAATH, 1976b; cf. sections 2.4.2 and 2.5.4).

However, it would be clear that *feedback*, as well as several other didactic functions, can be fairly well attained by means of thoroughly designed self-instructional material. Thus, in this respect, one and the same exercise might serve largely the same functions either it is included in a self-check test supplemented by model answers with comments or it is used as an assignment question.

Well-constructed self-check exercises might also be stimulating to the students and, if inserted into the teaching material in a sensible manner, may serve as subgoals. In addition to these *motivational* functions, other functions of the same kind are likely to be fulfilled. Thus, well-made model answers with comments could probably induce feelings of success (when solutions are found to be correct), maybe even provide support, encouragement and praise (by means of the course writer's comments in connection with the model answers). If so, this implies that the model answers and comments should be designed as a "simulated didactic conversation" (HOLMBERG, 1977b, 1978).

The feedback function in particular, but maybe also the motivational effects of the model answers (with comments), are probably strengthened by the fact that the model answers are available to the students without delay, whereas the turn-round time of submitted assignments is, in general, comparatively long. It is true that immediate feedback is of no evident advantage as concerns learning on reasonably demanding cognitive levels (KULHAVY & ANDERSON, 1972; STURGES, 1972a, 1972b; KULHAVY, 1977). Most likely, however, immediate feedback can be more effective than feedback delayed one week or more, which is normal in correspondence education.

Still, this potential favourable effect of self-check exercises with model answers may be counterbalanced by the fact that the student has "veto power over the success of written instruction" (ROTHKOPF, 1976, p. 94). Quite probably, several

correspondence students do not always make use of the self-check exercises (nor of the model answers). As a rule, it is much easier—at least on a short view—to omit self-check exercises than to leave out assignment questions intended for submission.

The *contact* function—the social psychology aspect of the two-way communication—would hardly be possible to fulfil equally well by means of self-check exercises with simulated two-way communication as by means of assignments with real two-way communication. It would nevertheless seem possible that the contact function is not affected, to any appreciable extent, by variations of the quantity of assignment questions per submission. Thus, a submission occasion with comparatively few questions might serve the same social function as one with a greater amount of assignment questions.

9.2.2 Implications of the experimental outcome

The experimental results which were reported in chapter 7 do not, in any respect, support an assumption that a reduction of assignment questions in favour of self-check exercises should entail unfavourable educational effects. Nor were any favourable educational effects of such a replacement proved, on the other hand. (It should be noted, however, that there remains some uncertainty as regards the internal validity of the Psychology of Management experiment. Cf. 7.6.1.)

The possible practical implications of this outcome appear evident. Still, with regard to the two experiments where this result was obtained it should be emphasized that

1 no assignment questions were completely left out; all the omitted assignment questions were replaced by self-check exercises
2 these self-check exercises were identical with the omitted assignment questions
3 all the self-check exercises, which were inserted instead of assignment questions, were supplemented by model answers with pre-produced comments within the teaching material
4 the model answers with comments corresponded, as nearly as possible, to the CADE comments which are provided in connection with the regular versions of the exercises (i.e., when these are used as assignment questions).

Thus, reducing the number of assignment questions, as it was made in the experiments according to design 2, would not mean an altogether cheap change to a correspondence school.

In addition, it should be pointed out that the experiments were carried out in only two subject areas—languages and behavioural sciences—using courses at a level that was not very advanced. Therefore, we cannot, without reservations, generalize the results to be applicable also to other subject areas, course levels, etc.

9.3 Computer-assisted two-way communication

9.3.1 Computerization as a feature of an industrialized form of teaching

As we have previously seen (section 2.2.1), PETERS (1973) has analysed correspondence education as an *industrialized* form of teaching, distinguished—among other things—by rationalization, careful planning, considerable division of labour, mechanization of certain functions, mass production, and assembly line principle for certain functions. Although this analysis does not apply to all types of correspondence education—in certain cases of correspondence education at the university level, an analogy with handicraft activities would be more adequate—it is rather illuminating with regard to such teaching as is arranged by all fairly large correspondence schools,

as well as by the British Open University and the West-German Fernuniversität. It might, therefore, appear logical to try to proceed one step further, automatizing those correspondence tutor functions which are highly repetitive and, consequently, can be handed over to a computer (cf. EHIN, 1973).

9.3.2 Multiple choice questions

As a rule, computer-assisted two-way communication off-line is coupled to multiple choice questions (or the like). This is not necessarily a disadvantage, although many European representatives of correspondence education appear hesitant to assignment questions of this type (BAATH, 1976b; cf. 2.5.2). No doubt, it is possible to design multiple choice questions for most kinds of cognitive objectives (COFFMAN, 1969; BLOOM ET AL., 1971; MILLER & WILLIAMS, 1973). Moreover, students

> . . . spend most of their time in thinking and writing when taking an essay test. They spend most of their time in reading and thinking when taking an objective test. (EBEL, 1965, p. 90)

Reading is normally a considerably quicker task than writing. Consequently, students get more time for thinking when taking a multiple choice test. (Alternatively, they save time for other activities!) It is interesting to note that cognitive learning psychologists like AUSUBEL (1968, pp. 300–301, 583–585) and BRUNER (1960, p. 30) adopt a favourable attitude towards multiple choice questions, whereas an extreme behaviourist like SKINNER (1968, pp. 216–217) rather takes the opposite position.

9.3.3 Functions of computer-assisted two-way communication, as compared with functions of traditional postal tuition

As regards the correction of and commenting on assignments in computer-assisted two-way communication, largely the same applies as was stated about model answers with comments within the teaching material (9.2.1). The feedback and motivation functions could, in principle, be served by means of computerized comments, whereas the contact function would probably be more difficult to fulfil this way.

It is even possible that the purely instructional functions – above all, *feedback* – could be *better* served in computer-assisted than in traditional two-way communication. Among facts which may support such an assumption are the almost unlimited capacity of the computer to store and to utilize data about the students and their previous achievements, and, further, the possibility in computer-assisted tuition consistently to provide extensive, carefully planned comments which – in addition – are always easily legible.

As concerns the *motivational* functions, multiple choice questions can be felt at least as stimulating as assignment questions of other kinds, judging from students' reactions (BAATH & MANSSON, 1977, p. 29). Computer-mediated tutor comments have also the advantage over comments by tutors in traditional postal two-way communication, that they can always be kept in a friendly, patient, encouraging spirit. The computer does not suffer from human weaknesses like getting tired or irritated. On the other hand, the computer does not possess the potentials of a human tutor to improvise, to adapt oneself to unexpected situations, to give something new in a personal dialogue.

In addition to the characteristics of the computer-assisted two-way communication now discussed, the turn-round time can be kept comparatively short. Yet, this was not entirely possible in the courses used for the experiments in the present study. Here, the total turn-round time was about one week, as an average, which is only two or three days shorter than in the regular versions of the same courses (cf. 4.3).

9.3.4 The experimental outcome and its implications

In essential respects, the experimental outcome favours the computer-assisted system, at the same time as none of the results tell against it. Particularly remarkable are the students' attitudes to the scrutiny of their submitted solutions. In both courses, the students are more satisfied with the computer-assisted tuition than with the tutor's manual correction and commenting. This supports the assumptions about the instructional and motivational functions of computer-assisted two-way communication (see the previous section). It is also well in agreement with data from the evaluation of the CADE system (BÅÅTH & MÅNSSON, 1977; cf. section 2.5.10). It may, on the other hand, also be regarded as an indication of imperfections on the part of the traditional two-way communication, as practised in the two courses (cf. above, 9.1.4).

Not even the *contact* function was experienced less favourably in the computer-assisted versions than in the traditional ones, judging from the answers to the questionnaire questions about feelings of isolation and need of simultaneous contacts. Rather, the results take the opposite direction (tables 93–94), although no significant differences were proved.

The favourable outcome with regard to study perseverance (start and completion) and study rate (gross study time) confirms results reported by BRITTAIN (1973).

The outcome regarding final test results—no significant differences—should be seen in the perspective that, in each course, the test was common to both versions and contained an equal share of multiple choice questions and free answer questions (cf. 4.6.1). Thus, the design of the test did not favour any of the experimental groups.

The original aim of the CADE project was of an exclusively practical nature—to search for new ways to render correspondence education more effective and to improve its instructional quality (BÅÅTH, 1971). The outcome of the two field experiments according to design 3 have also clear practical implications. Correspondence education with computer-assisted two-way communication off-line, arranged as in these experiments, appears to yield educational effects which are, in several respects, more favourable than the effects of traditional correspondence education. Although the strength of the relationships found is not throughout of a considerable magnitude, an implementation of computer-assisted tuition certainly appears justifiable from an educational point of view. However, it would be advisable to introduce such a system only if the expected costs for using it, in the long run, do not outweigh the costs for providing the traditional tuition. In case of comparatively large correspondence teaching institutions with a reasonable number of courses, each of them attracting hundreds of new students every year, a computer-assisted system may even turn out cheaper than a traditional one (cf. BÅÅTH & MÅNSSON, 1977).

Computer-assisted two-way communication has already been tried in a considerable number of different subjects at varying levels (cf. 2.5.10). Still, it is naturally not possible, without reservations, to generalize the findings of this study neither to other systems for computer-assisted two-way communication, nor to other subject areas and course levels than have been used here. Nevertheless, the experience which has been gained until now indicates that the computer constitutes a very useful addition to the educational aids of correspondence tuition.

No doubt, the usefulness is widened if the system for computer-assisted two-way communication is designed in such a way that it can be combined with traditional tuition—as is already practised in Norway at NKS with regard to CADE. There may be various reasons for such a combination: that certain learning objectives or instructional goals are not suited for multiple choice questions (i.e., the students should be trained in written communication or in the formal handling of mathematical problems), or that more flexible and adaptive mail contacts are desirable than are allowed by the computer-assisted system.

9.4 The problem of discontinuation

In addition to what was found in the experimental comparisons, one more finding – of a more general kind – may deserve attention in this context. What I have in mind are the results regarding *study perseverance*, i.e., start and completion.

9.4.1 The adequacy of start and completion as measures of study perseverance

It has been questioned whether start and – in particular – completion are adequate as measures of study perseverance (e.g., WEDEMEYER, 1971; DELLING, 1975). Students *may* apply for a correspondence course without intending to complete it. They may even study a whole course and get out of it what they want to, without sending in one single solution. They may also break off both their submitting of assignments and their studies on the whole when they have found in the course what they were after. Examples of this have been reported by other researchers (e.g., JAMES & WEDEMEYER, 1959; GARDELIUS & HANSSON, 1980).

In this study, some of the answers to the dropout questionnaire (section 5.3, tables 35–36 and 38) are along the same line. It can hardly be doubted, however, that most of the "non-starters" are real non-starters – that is, they have not at all begun studying their course. In the same way, a majority of the "dropouts" are, most probably, real dropouts: students who have not completed their course although it was their original intention to do so, and in spite of the fact that they have not got out of the course what they needed or wanted to obtain from it.

From this follows that start and completion can be regarded as reasonably adequate measures of correspondence students' study perseverance. Consequently, the considerable proportions of non-starters and non-completers in most of the courses investigated are certainly worth noticing. It is true that these proportions are not larger than the proportions that have been observed in several other studies on correspondence education – and on other forms of non-compulsory part-time adult education, as well. The result is, nevertheless, somewhat surprising. Bearing in mind that most of the courses are comparatively short, we might have expected better completion rates than have been reported here. Still, the shortest course – the only one which is also clearly vocationally-oriented (another factor generally related to study perseverance; cf. 2.8.1) – shows the highest values with regard to start as well as to completion: Psychology of Management.

The remarkably low values of Advanced Economics may partly be due to the fact that some British adult students apply for both evening courses and correspondence courses in the same subjects, in order to prepare themselves as completely as possible for the examinations (GLATTER & WEDELL, 1971). In cases like these, the students may take from the correspondence course material what they want, without submitting any assignments for correction and commenting.

9.4.2 Reasons for/causes of discontinuation

A reasonable hypothesis concerning non-deliberate discontinuation of correspondence courses was stated by MALLEY ET AL. (1976): Weak integration into the social system of a teaching institution increases the probability of a student's dropping out. Since most correspondence students are probably weakly integrated into the social system of their school, they might, in general, be potential non-completers (cf. 2.8.1).

The main reasons for/causes of discontinuation, stated by the students themselves, are of another kind, however. In most studies on the dropout problem, with regard to correspondence education as well as to other forms of non-compulsory part-time adult education, students have generally given the same causes and reasons as were

found in this study: lack of time, other high-priority activities have interfered, and/or plans have been changed.

It is of course difficult to know to what extent these causes/reasons are the basic ones. One would guess, however, that stronger integration into the social system of the school and/or a teaching better adapted to the students in question could have made at least some of them rearrange their time schedules, change their priorities—and, consequently, hold on to their initial plans.

9.4.3 Possible ways of reducing non-start and non-completion rates

Two of the independent variables studied in this investigation, submission density and type of two-way communication, yielded experimental effects with regard to study perseverance. Both high submission density and computer-assisted two-way communication correlated with start. In one experiment, computer-assisted two-way communication also correlated with completion. Some of the relationships were comparatively weak, however. In order that substantial improvements of starting and—in particular—completion rates should be obtained, other arrangements must also be tried.

Shorter turn-round time of students' solutions (2.5.11) can increase the proportion of completers (REKKEDAL, 1973). According to some studies (e.g., REKKEDAL, 1972b), reminders, encouraging letters etc. can also affect study perseveration in a favourable way.

Most probably, more active counselling of prospective students could eliminate one potential cause of non-start and non-completion. It appears that far from all students have made it clear to themselves, in advance, at what level their course is, what it deals with, and what it demands of them. In the present investigation, above all the enormous individual differences as concerns study time indicate a need of better pre-enrolment counselling. Clearer descriptions of courses, preferably supplemented by representative extracts, would probably be of good help. In addition, personal counselling—or computer-assisted counselling (KÜFFNER & STALLER, 1978; FRITSCH ET AL., 1979)—before each definite choice of course would certainly also be highly desirable. Favourable results of inserting a short how to study course at the beginning of the studies were reported by REKKEDAL & HALLEM (1974).

There is much evidence that the most critical part of a correspondence course is the very beginning of it—the first study unit or the first few units. The proportion of non-starters is often great, and the majority of the remaining non-completers drop out as early as in the first part of the course (JAMES & WEDEMEYER, 1959; HARTER, 1969; PFEIFFER & SABERS, 1970; REKKEDAL, 1972a). More active study counselling would probably reduce this initial dropout, in particular.

But there is more that correspondence schools could—and should—do with regard to the start of the course and the first part of it.

9.4.4 A probable highway to the reduction of non-start and non-completion rates in pure correspondence education

Obviously, one means of facilitating the start is to make the first study unit(s) comparatively short (see above, 9.1.2) and easy. However, the most important didactic measures which could be taken in order to reduce non-start and early dropout certainly refer to the two-way communication element.

In my discussion of correspondence education in the light of a number of contemporary teaching models (BÅÅTH, 1979), I suggested that, *on a very early stage, the correspondence tutor should contact each of his or her new students*

- to be able to individualize his/her tuition with regard to the student's previous "reinforcement patterns" (*Skinner*), or

- to facilitate the student's "mathemagenic activities" (*Rothkopf*), or
- to be able to anchor the material of the first study units in the student's individual previous knowledge and "cognitive structure" (*Ausubel*), or
- to get an idea of the student's comprehension of the basic concepts and principles of the course (*Bruner*), or
- to establish a good personal relationship with the learner (*Rogers*).

This implies that, to some extent, the tutor gets to know his or her students. Therefore, the main purpose of the initial mail contacts (on the tutor's initiative) should be that the student and the tutor become acquainted with each other. By this, the *tutor* could get an idea of the new student's study experience, previous knowledge, interests, and principal motives for taking the course – information that should be useful, particularly, when it comes to giving the student adequate help at the beginning of the course.

If in addition, the *student* gets to know his or her tutor at a very early stage – which implies that the tutor also introduces himself/herself rather fully – this might further the student's integration into the social system of the school (cf. MALLEY ET AL., 1976).

9.4.5 Face-to-face contacts as a means of promoting study perseverance

Face-to-face contacts might be an even more effective way of facilitating the start of the studies (BAATH, 1979). In practice, face-to-face contacts are also comparatively often used as a supplement of correspondence education, above all in the Socialist countries (cf. section 1.4). The most tangible effects of combining correspondence education with face-to-face contacts appear to be, precisely, higher proportions of starts and course completions, as well as a higher study rate (LOCKWOOD, 1973; BOLTE ET AL., 1974; MÜLLER, 1974; NESS, 1976; SMITH, 1976).

However, face-to-face contacts imply constraints with regard to time and place – constraints which do not encumber in pure correspondence education. If the face-to-face supplement is made compulsory, it may prevent certain prospective students from taking part in the course. This applies, above all, to individuals whose practical possibilities to attend the face-to-face sessions are small or non-existent, but also to persons who choose correspondence education because they are attracted by the relative independence that is offered by this study form or because they prefer not to meet new people in connection with their studies.

One possible solution is to make the face-to-face contacts optional, like the face-to-face tutorials arranged by the Open University and also by several correspondence schools (see, e.g., BONANI, 1980). In many cases, however, such non-compulsory tutorials are very little attended (BÅÅTH, 1976b).

Another solution is to offer one and the same course both as a pure correspondence course and as a combined course (correspondence study + integrated face-to-face contacts) – a solution much practised in Norway (cf. 2.7.2).

9.4.6 Telephone tutoring as a means of promoting study perseverance

In the industrialized countries, a third way of combining simultaneous contacts with correspondence education, without destroying the students' freedom with regard to time and place, would be to replace the face-to-face sessions by telephone contacts.

Although the participants of this investigation were not markedly in favour of suggested telephone contacts, the telephone appears to be, potentially, a most useful supplementary aid to correspondence education (FLINCK, 1975a, 1978; BÅÅTH, 1979). It is already successfully utilized in Swedish distance education at the university level (FLINCK, 1976b, WILLÉN, 1978). The telephone combines most of the educational possibilities – related to learning, motivation and social psychology (as

has been discussed in 9.1–9.3)–which can be offered by face-to-face contacts, with the flexibility as regards place and time that is regarded, by many students, as the greatest advantage of correspondence education.

9.4.7 In conclusion

No doubt, correspondence education is a powerful form of instruction in itself. As should be obvious from my theoretical study (BÅÅTH, 1979), its potential is–in many cases–far from fully utilized. Nevertheless, correspondence education plays an important role in the adult education and vocational training of many countries.

However, if the integration is sensibly arranged, correspondence study can very well be combined with other forms, e.g., face-to-face sessions and telephone tuition. Whenever possible, this may be the easiest way to reduce the proportion of non-starters and other non-completers and, by that, to increase the usefulness of correspondence education to society.

Part IV: Résumé

10 Summary

10.1 Background and aim of the investigation

In the investigation reported in this thesis, a study was made of a number of variables which are related to the two-way communication element of correspondence education.

Correspondence education is normally carried on by means of (1) preproduced, (more or less) *self-instructional teaching material*, and (2) *two-way communication at a distance* between student and tutor/teaching institution. In **chapter 1**, I briefly introduced this form of teaching: definitions, origins, development and various forms, extension and varying status. In this context, the situation in Sweden was highlighted. As late as during the 1960s, correspondence education was utilized to an unusually high degree in this country and enjoyed a very good reputation. Since then, Swedish correspondence education has met with a severe quantitative decline, mainly due to an "injustice within adult education" (LARSSON, 1978), not yet eliminated: Whereas practically all adult education in Sweden was made more or less free of charge in 1967, most Swedish correspondence students still do not receive any public subsidies at all. The drastic contrast to the situation in Norway was pointed out.

Chapter 1 was concluded by a list of terms with explanations.

The purpose of **chapter 2** was to discuss more in detail certain elements and aspects of correspondence education, which are of immediate relevance to the present experimental study. In this chapter, some principal lines of previous research within the area were presented: the hitherto very few theoretical approaches, and the somewhat more frequent empirical studies of students, teaching material, postal two-way communication, other types of student-tutor contacts, and study results.

In the literature on correspondence education, the postal two-way communication between student and tutor is often regarded as a highly important element of this teaching form. As a rule, the two-way contacts are induced by so-called *assignments for submission*. These are provided on special submission occasions, each study unit of the course being concluded by such an occasion. The answers to the assignment questions should be sent in to the correspondence school for corrections and comments by a tutor.

The most important function of the assignment questions and the postal two-way communication based on such questions is usually assumed to be a purely didactic one, related to learning psychology: (1) to provide *feedback* to the student as regards his or her learning progress. In addition, (2) *motivational* factors are often emphasized in this context: (a) the submission occasions serve as sub-goals on the way towards the sometimes fairly distant terminal goal (the conclusion of the course); (b) the student may be stimulated by working on the assignments; (c) he/she may also get opportunities to experience success and receive encouragement during the study work. In addition, the postal two-way communication may also serve a function related to social psychology–(3) to enable students to experience *contact* with the school and, by that, to counteract possible feelings of isolation in the study situation.

However, postal two-way communication is connected with considerable problems. Some of them are endogenous; they are inherent in the teaching form as such and derive from the distance between student and tutor–the distance in space and (maybe even more important) in time. In addition, there are exogenous problems which

have been accentuated in many countries during recent years. These problems are caused by rising costs for postage and for tutors' salaries, as well as by deteriorated services from the Post Office Departments. As a consequence of the latter practical difficulties, the submission occasions of correspondence courses tend to be more infrequent and the turn-round time of students' submitted assignments tend to be longer.

Problems of these kinds have, hitherto, been studied scientifically only to a very modest extent. Two-way communication in correspondence education was therefore chosen as the research area of the project within which the present investigation was carried out. In **chapter 3**, the research project was presented, as well as its three sub-projects:

1 Postal two-way communication
2 Systematic telephone tutoring as a supplement to postal two-way communication
3 Face-to-face contacts as a supplement to postal two-way communication

Sub-project 1 is reported in this thesis. The main problem areas of sub-project 1 were

1 The submission density of assignments in correspondence courses
2 The possibility of replacing a substantial part of the assignments for submission by self-check exercises
3 The possibility of replacing the routine parts of the traditional two-way communication between student and tutor by computer-assisted two-way communication.

All the three problem areas were studied by means of an experimental approach.

Submission density refers to the proportion between the number of submission occasions in a course and the length of the course. Thus, low submission density implies a comparatively small number of planned and arranged mail contacts. An increase of the submission density might, therefore, result in not only shorter steps between the sub-goals and more frequent feedback, but also more opportunities to experience stimulation and encouragement in the study work, and maybe also a stronger feeling of contact with the correspondence school.

Most likely, the feedback function and a number of other purely didactic functions can, to a considerable extent, be served within the teaching material by *self-check exercises with model answers and comments*. To some extent, the motivational functions can probably also be fulfilled by means of such an arrangement. However, self-check exercises with simulated two-way communication can hardly fulfil the contact function that assignments with real two-way communication supposedly serve. It is nevertheless possible that substantial proportions of assignment questions could, without adverse educational effects, be replaced by self-check exercises with model answers and comments within the teaching material.

By a system for *computer-assisted two-way communication*, a correspondence school can give each student full and fairly individualized comments on submitted assignments, within an unaltered or shortened turn-round time, compared with traditional postal two-way communication. The costs for the two-way communication can also be kept unchanged or even be reduced, provided that the courses in which the computer-assisted system is used attract reasonably great numbers of students a year. It was therefore considered interesting systematically to study the educational effects of replacing the routine parts of the traditional two-way communication by computer-assisted tuition.

The following groups of hypotheses were stated:

1 Various degrees of *submission density* lead to differences with regard to study perseverance (start, completion), attitudes (to various aspects of the study), achievement (final test), and study time (gross and net study time).

2 Various quantities of *assignment questions on each submission occasion* (omitted assignment questions being used as self-check exercises with model answers and preproduced comments) lead to differences with regard to study perseverance, attitudes, achievement, and study time.

3 Various *types of two-way communication* (computer-assisted–traditional) lead to differences with regard to study perseverance, attitudes, achievement, and study time.

10.2 The investigation

The design and procedure of the investigation were described in **chapter 4**.

The three groups of hypotheses were tested in field experiments, using a number of existing correspondence courses. The courses were described in section 4.2; certain data about the courses and the experimental versions and variants of these courses were summarized in *table 11*. A brief description of the system for computer-assisted two-way communication (CADE) which was used in some of the courses/course versions, was provided in section 4.3.

The sampling and randomization of participants should be clear from section 4.4, and the experimental designs from section 4.5.

The following courses/course versions were utilized in experiments aimed at studying *problem area 1*, the submission density:

- YES 1 (Hermods, computer-assisted two-way communication)
- YES 1 (Hermods, traditional two-way communication)
- Psychology, General Course (Hermods, computer-assisted two-way communication)
- Psychology, General Course (Hermods, traditional two-way communication)
- Physics, Elementary Course (Hermods, computer-assisted two-way communication)
- Advanced Economics (the RRC, traditional two-way communication).

In each of these courses/course versions, three experimental variants were arranged, with high, regular and low submission density, respectively. The design (*design 1*) was one-factorial with independent groups.

Problem area 2, the possibility of replacing a substantial part of the assignment questions by self-check exercises with model answers and pre-produced comments, was studied in the following courses/course versions:

- YES 1 (NKS, computer-assisted two-way communication)
- Psychology of Management (Hermods, computer-assisted two-way communication).

In each course/course version, four experimental variants were arranged, with systematic variation of the number of assignment questions per submission as well as of the submission density. The design (*design 2*) was 2x2 factorial with independent groups.

In experiments aimed at studying *problem area 3*, the possibility of replacing (the routine parts of) the traditional two-way communication by computer-assisted tuition, the following courses were used:

- YES 1 (Hermods), both the computer-assisted and the traditional version
- Psychology, General Course (Hermods), both the computer-assisted and the traditional version.

Thus, data from these two courses were utilized both for experiments aimed at studying problem area 3 and for experiments with the purpose of studying problem

area 1. Therefore, in each of these courses six experimental variants were arranged, the type of two-way communication as well as the submission density being systematically varied. The design (*design 3*) is 2×3 factorial with independent groups.

Data were collected by means of a special register of students, postal questionnaires (enrolment and final questionnaire, as well as a particular "dropout questionnaire"), and a final test, also sent by mail (section 4.6). The data collection was performed during 1974–1977.

In all, 1805 students were allocated to experimental groups. Out of these, 55 dropped out entirely, which means that the actual total number of participants in the experiments was 1750. A description of these students was provided in section 4.7.

A survey of the data loss was given in **chapter 5**. Although comparatively few students dropped out of the investigation entirely, the partial data loss was considerable. This is mainly due to the great proportion of non-completers (about 69 per cent). As concerns these participants, no data could be obtained regarding final questionnaire, final test or study time. Moreover, only half of the non-completers returned the dropout questionnaire, and one third of the completers did not provide full data with regard to net study time. Therefore, neither data from the dropout questionnaire nor net study time data were utilized for statistical tests of group differences.

In one of the courses–Advanced Economics–the proportion of completers was so small (about 8 per cent) that no outcome variables except start and completion could be used for comparisons between the experimental groups.

The answers to such questions in the dropout questionnaire as were specifically intended for the non-completers, were reported in section 5.3. Out of those non-completers who returned the questionnaire only 14 per cent regarded themselves as dropouts. Thus, a substantial majority stated that they were still studying or had the intention to start/resume their studies later on. However, most of these students had not reached very far in their course. According to themselves, the main cause was other work and lack of time. Still, course-related problems were also, to a comparatively great extent, stated with regard to two of the courses: Psychology, General Course and Advanced Economics.

The non-completers were also asked if they thought they had already gained what they wanted from their course. About one third of those non-completers who had returned the questionnaire and had studied at least part of their course (= slightly more than 9 per cent of all the non-completers) answered this question in the affirmative.

10.3 Results

10.3.1 In general

Both the *starting* and the *completion* rates were low, in general. Only 58 per cent started submitting assignments, and not quite 31 per cent completed their course. However, in both cases the variation between courses was considerable.

Among the completers and those non-completers who returned the dropout questionnaire, the attitudes were throughout decidedly favourable to *the course and the teaching as a whole*, to *the assignments for submission*, and to *the correction of and commenting on submitted assignments*.

A clear majority of the completers–about 65 per cent–denied that they had experienced any *feelings of isolation in their study situation*. The corresponding proportion was 50 per cent for those non-completers who returned the dropout

questionnaire. However, the distributions were U-shaped, which means that comparatively many students actually stated that they had felt isolated (completers 24 per cent, non-completers 38 per cent).

A weak majority stated positive general attitudes to *simultaneous contacts* as a support to the correspondence instruction (telephone contacts with the tutor, face-to-face contacts with fellow students and/or with the tutor or another teacher). As for the different kinds of simultaneous contacts, the by far most clearly favourable attitudes refer to face-to-face contacts with a teacher. About 52 per cent among the completers (against 7 per cent negative) expressed their interest in such supplementary two-way communication. The corresponding proportion among non-completers was 56 per cent (against 18 per cent negative).

The average *gross study time* varied from moderately long to short – from nearly nine to slightly less than four months. The same applies to the average *net study time*: from about 75 hours to about 25. In both cases, the lowest value refers to Psychology of Management.

The individual variations with regard to study time were extremely great, however – from one or a few weeks to one or two years (gross study time), and from one or a few hours to one hundred hours or more (net study time). In one course version (YES 1, NKS) the extreme values were 1 and 100 weeks (gross study time), and 1 and 530 hours (net study time).

10.3.2 Experiments according to design 1 (main problem: submission density)

The experimental outcome of the systematic variation with regard to submission density was reported in **chapter 6** and summarized in *table 61* (section 6.6.2). As concerns *start*, an almost entirely consistent result was obtained: In all courses/course versions except one (YES 1, H, traditional), higher submission density correlated with a greater proportion of starters.

With regard to *completion*, two significant differences were found (YES 1, H, traditional, and Advanced Economics). However, since the differences take diverging directions, this result is difficult to interpret.

Five significant differences were established with reference to attitude variables. In Physics, Elementary Course, higher submission density correlates with more positive *attitudes to the assignments for submission*. If the two Swedish versions of YES 1 are combined, another significant difference appears, concerning the *overall attitudes to the course and the teaching* (section 8.3.1). Also this difference is in favour of higher submission density. The three remaining significant differences refer to the *attitudes to the submission density*. Here, high-density groups were negative to an increase of the number of submissions, whereas low-density groups favoured such an increase, and medium-density groups were uncertain.

In the two Swedish versions of YES 1, significant differences concerning *gross study time* were also proved. In both cases, lower submission density correlated with shorter study time.

In conclusion, the hypotheses related to problem area 1 were supported only to a minor extent. The manipulation of the variable submission density yielded certain experimental results with regard to start, completion, attitudes to the course and the teaching as a whole, attitudes to the assignments for submission, attitudes to the submission density, and gross study time. However, under the experimental conditions arranged, it appears to have been possible to vary the submission density to a fairly great extent, with only slight experimental effects except for the variables start and attitude to the submission density.

10.3.3 Experiments according to design 2 (main problem: the possibility of replacing a substantial part of the assignment questions by self-check exercises)

The outcome of the experiments according to design 2 was reported in **chapter 7** and summarized in *table 86* (section 7.6.2).

With regard to the main experimental variable—the number of assignment questions per submission—only one significant difference was found. This refers to the attitudes towards the quantity of assignment questions per submission. In Psychology of Management, a low number of assignment questions per submission correlated with more favourable attitudes to an increase of the quantity of such questions.

In conclusion, with one single exception, the hypotheses related to problem area 2 were *not* supported. In both courses investigated it was apparently possible, without any noticeable effects—neither negative, nor positive—to replace substantial numbers of assignment questions by self-check exercises with model answers and pre-produced comments within the teaching material.

As regards the submission density variable, one significant difference was established in the two experiments according to design 2. This difference refers to the attitude to the school's correction of and commenting on submitted assignments. In YES 1 (NKS), high-density groups were more favourable towards the correction and commenting than were medium-density groups.

10.3.4 Experiments according to design 3 (main problem: computer-assisted two-way communication *versus* traditional postal tuition)

The outcome of the experiments according to design 3 was reported in **chapter 8** and summarized in *table 99*.

In 20 statistical testings related to the problem area, 7 significant differences were proved. Six of these took one and the same direction. *Computer-assisted* two-way communication was found to correlate with a greater proportion of *starters* (both courses), a greater proportion of *completers* (Psychology, General Course), more positive *attitudes to the correction of and commenting on submitted assignments* (both courses), and shorter *gross study time* (Psychology, General Course).

The remaining significant difference referred to the *attitudes to the type of assignment questions*. Here, the differential experimental treatment correlated with a positive attitude to the type of assignment questions obtained in the course (YES 1, H).

In conclusion, a considerable number of the hypotheses related to problem area 3 were supported by the experimental results. In both courses investigated it was apparently possible, without any adverse effects whatsoever, to replace the traditional two-way communication by computer-assisted tuition. The computer-assisted two-way communication seems even to have yielded *better* effects than the traditional one, as concerns study perseverance, attitudes, and gross study time.

10.4 Discussion

In **chapter 9**, the theoretical and practical implications of the experimental results were discussed.

In the experiments according to *design 1*, the outcome concerning the variable start indicates some minimum advice to course planners and editors: At least, make the first study unit of a correspondence course comparatively short.

However, the largely insignificant effects as to the remaining outcome variables should be interpreted with some care. It is possible that, to some extent, the experimental arrangements favoured the medium-density variants. It is also probable that,

in one respect, the experiments according to design 1 were not entirely realistic: Although the submission density was systematically varied, the total number of assignment questions was kept constant – in order not to risk giving certain groups of students a kind of tuition which could be assumed to be clearly inferior to the regular one which they had applied for. (Cf. tables 12, section 4.2.2, and 100, section 9.1.3.) It is therefore possible that submission density is, in practice, a more important variable than the experimental outcome can demonstrate.

The results of the experiments according to *design 2* appear to have evident practical implications: Substantial portions of assignments for submission can be replaced by self-check exercises – provided that these are identical with (or similar to) the omitted assignments and that full model answers with comments are provided within the course material. However, the results cannot, without reservations, be generalized for application to other subject areas, course levels etc. than those concerned in the experiments.

The outcome of the experiments according to *design 3* may be due to the following characteristics of the CADE system:

- the assignment questions of a multiple choice type (probably less time-consuming than traditional assignment questions, sometimes perhaps also more stimulating)
- the comment letters (carefully planned, comparatively extensive, easily legible, designed to promote students' motivation)
- the turn-round time (comparatively short).

At least concerning the subject areas and course levels included in the experiments, an implementation of computer-assisted tuition of the CADE type appears justifiable from an instructional point of view. Nevertheless, it would be advisable to introduce such a system only if the expected costs for using it, in the long run, do not outweigh the costs for providing traditional tuition. Moreover, correspondence schools should consider not only pure computer-assisted postal tutoring but also combinations between computer-assisted and traditional tuition by mail.

In addition, considering the great proportions of non-starters and non-completers in most of the courses investigated, *the problem of discontinuation* was finally discussed, and possible practical ways of increasing study perseverance rates were indicated.

The results from this investigation make it plausible to assume that computer-assisted two-way communication and high submission density – especially when combined – promote start and completion. However, other arrangements must also be tried.

Empirical investigations as well as theoretical considerations (BAATH, 1979) indicate that the most critical part of a correspondence course is the first study unit or the first few units. Therefore, the most efficient way to decrease the discontinuation rates probably is to put particular emphasis on the tutor-student contacts – on the t u t o r's initiative – at the beginning of the studies.

As was demonstrated in my theoretical study (BAATH, 1979), all desirable tutor-student interactions can very well be carried out *by mail*. However, expecially at the beginning of a course, supplementary *face-to-face* sessions may be an easier way to establish certain tutor-student contacts. In order to overcome the practical disadvantages of face-to-face sessions, while still aiming at additional simultaneous two-way communication, *telephone* tutoring may instead be used as a valuable supplement to correspondence education.

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Appendices

Appendix 1. Example of postal tuition, YES 1 (Hermods, traditional version)

(2p)

6 Vad säger du när du vänjer dig av i en fullsatt bussbuss på bus?

EXCUSE me

Vad säger du om du råkar trampa någon på tårna?

(I am) sorry

2p

(5p)

7 Fyll i: at, in eller on.

We work at the car factory

They live in 8 dollars a week

There are a lot of girls at the office

Look at the house

We swim at 6 o'clock

eller: i en the office

4p

(5p)

8 Stryk under de ord, där s uttalas annorlunda. Ex: s

~~bus~~

~~as~~

~~sausage~~

~~silk~~

~~house~~

~~modern~~

~~dress~~

~~lamps~~

~~jam~~

~~sailor~~

~~sandwich~~

~~sprinkle~~

4p

Betyg 4

HERMODS

18 MAI 1976

Sätt bra poäng, men se upp med de plumskiva fel! Du gjort i uppgift 5: -(-1)=5 J e pass noga, Ola! skillnaden mellan il as och there is!

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Appendix 2. Example of computer-generated comment letters, YES 1 (Hermods, computer-assisted version)

Hermods

Jean Voigt 75-08-23

(Name and address omitted)

YES 1 Studieenhet 2 61-516

Jag hoppas att följande kommentarer kan hjälpa dig att förstå det mer avancerade sätt du använt dig av engelskan hittills. Jämför med instruktionsuppgifterna förberedning, och slå upp i korrespondenslistan efter hand.
Mina kommentarer hänför sig till de nummerbeteckningar som anbringats.

Märker du att övningarna i text- och övningsboken och i handledningen för självstudiet har god tendens, så att du är bättre förberedd för instruktionsuppgifterna?

1 b Du har förenklat c.
Dessa ord som slutar på o får -oes i flertal, så a tomato - tomatoes. - Se ordlistan, s 17.

7 c Du tycktes att allt o var det riktiga.
På svenska säger vi 'på arbetet', men på engelska heter det at work. Det går sällan att översätta prepositioner direkt, utan vi måste lära varje uttryck för sig.

10 b Du har svarat att a är det rätta alternativet.
I stället för skrivatta kan vi säga new. Därför bästa sätt hota skrivitta tvacegg (s 11-12 i ordlistan). English, Swedish och andra nationalitetsadjektiv ska alltid ha stor begynnelsebokstav i engelskan. Jfr s 47 i ordlistan.

19 a Ditt förslag var c.
Det kan hete There is, eftersom den på svenska kan säga 'Det finns en fabrik ...' Se ordlistan, s 47-48 och exemplen i lektion 4c.

20 b Du valde svarsalt a.
Eftersom 'many people' är flertal (plural), säsom det heta ALLA teorn. Jfr s 98 i ordlistan.

21 c Du har förenklat a.
'En gång' heter once, även om det inte är direkt fel att översätta det ordagrant. Här 'i månaden' betyder 'per månad' enmada uttrycket g month. På samma sätt: två gånger i veckan = twice a week.

Du har nu kommit långt att rätta dina fel och att stryka över alla felaktiga svarsförslag i samtal med instruktionsuppgifter?

Av 20 möjliga har du 19 rätt.

Hermods AB
Liber Grafiska AB Postadress 205 10 MALMÖ Gatuadress Stadsgatan 24 Telefon 040-758 00

Hermods

2

Du har gjort framsteg. Det är roligt när våra kursdeltagare verkar att arbeta aktivt och tycks ha utbyte av sin kurs.

Ditt betyg blir G.

Vänliga hälsningar

Jean Voigt

Hermods AB
Liber Grafiska AB Postadress 205 10 MALMÖ Gatuadress Stadsgatan 24 Telefon 040-758 00

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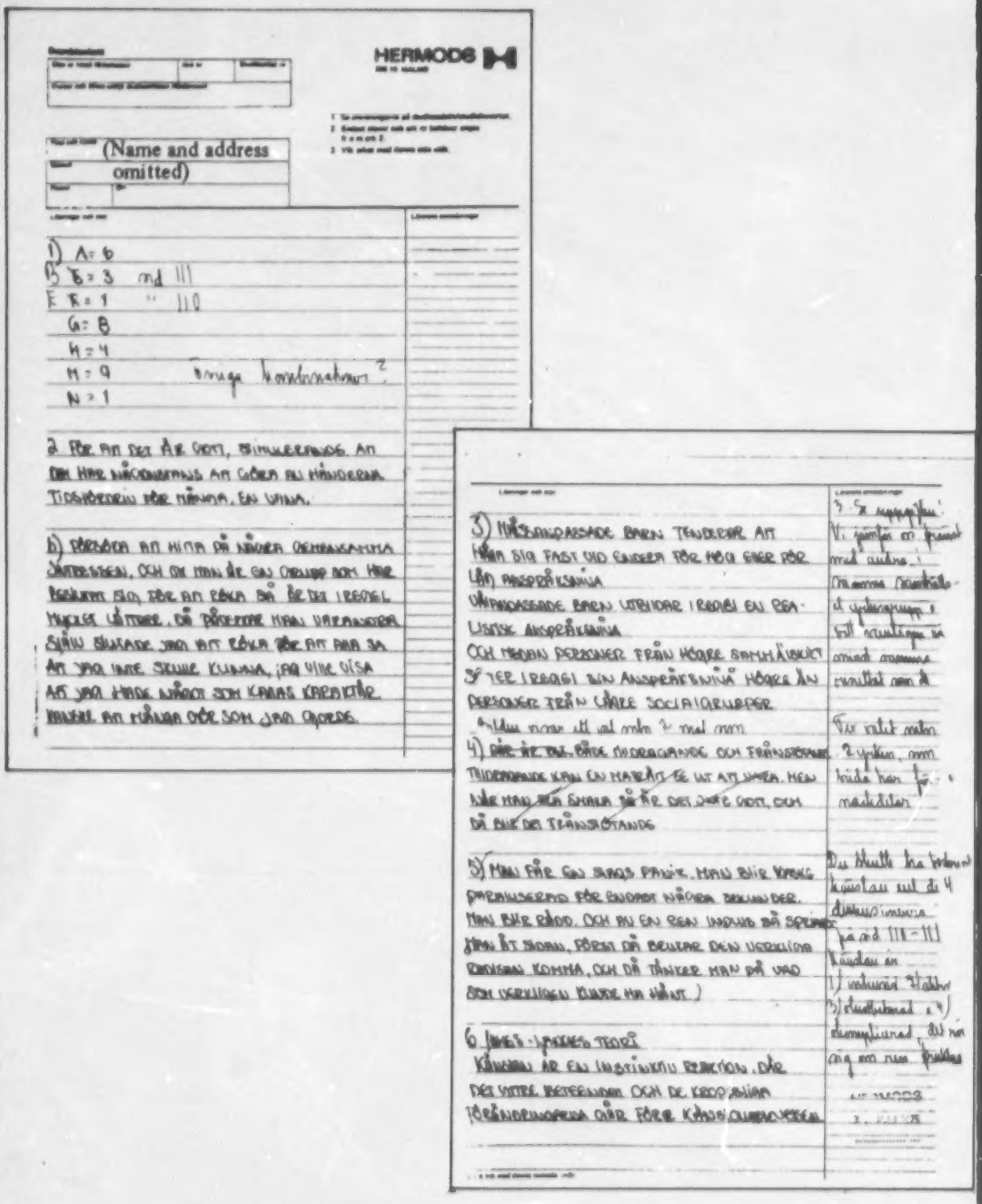
Appendix 3. Example of postal tuition, Psychology, General Course (traditional version)



HERMODS

(Name and address omitted)

1) A: 6
B: 3 md III
E: 1 " II
G: B
H: 4
M: 9 Övriga kombinationer?
N: 1

2 För att det är dyrt, stimulerande att den har möjligheten att göra så händelsen. Tidsåtgången för många, en viktig.

b) Försöka att hitta på något ordentligt intressant. Och de man är så övertygad om har resultatet sen, för att räkna på är det i regel mycket lättare. Då påpekar man varandras själv skulle skada och att räkna för att man så att vad inte skulle klarats, så vill visa att vad hade något sen kanske karaktär mindre att målade där som vad gjorde.

3) Mångsidigt skadade barn tenderar att hålla sig fast vid känslor för hög eller för låg prestationskrävande
Underpresterade barn utbildar i regel en psykiatrisk anspråksnivå
och mellan personer från högre samhällsskikt ser i regel sin anspråksnivå högre än personer från lägre socialgrupper
4) Där är två stora nedbrytande och frånstötande tillfällen kan en människa se ut att vara. Men när man ska ändra på är det svårt att, och då blir det frånstötande

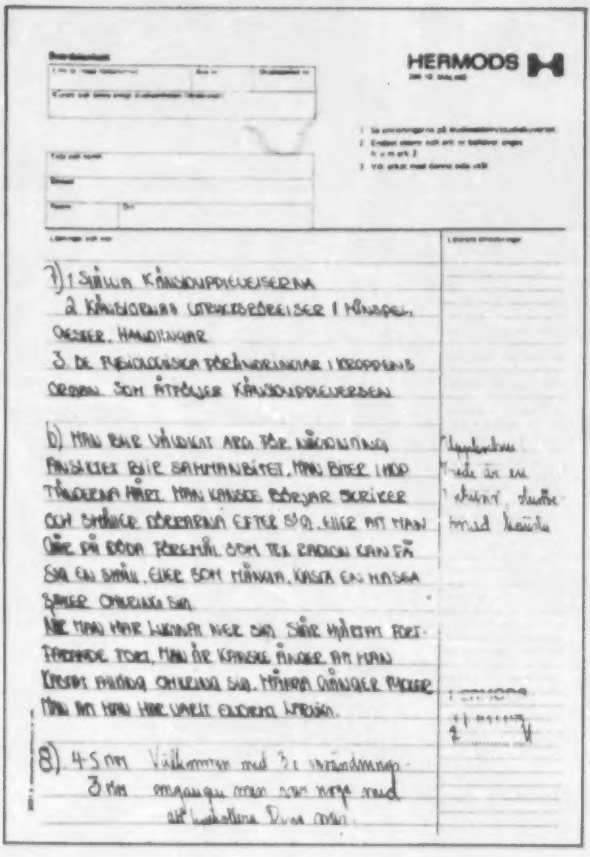
5) Man får en bättre prick. Man blir kreativ förutsättning för många nämna beslut der. Man blir rädd. Och på en sen individ då spelar jag åt honom, först då belönar den verkliga kreativa komma. Och då tänker man på vad den verkligen bättre ha blivit.)

6 Inre - yttre teori
Känsla är en instinktiv reaktion, där det yttre beteendet och de kroppsliga förändringarna går före känsla/emotionen

? Är uppgiften
Vi pratar en hemsk
med andra
Om samma resultat
ut uppsatsuppg
till resultaten är
annat samma
resultat som å

För rolig mån
? uppsats, om
hinda han få
medicinen

Du skulle ha behövt
kunskaper om de 4
dimensionerna
på sid 111-111
Känslan är
1) instinktiv ? tolkn
2) medfödd och 4)
dimensionerad, det är
mig en stor fråga


HERMODS

7) 1 SJÄLVA KÄNSLOUPPLEVELSERNA
2 KÄNSLORNAS UTTRYCKSFORMER I MIMIK, GESTER, HANDLINGAR
3 DE FYSIOLOGISKA FÖRÄNDRINGARNA I KROPPENS ORGAN SOM ÅTFÖLJER KÄNSLOUPPLEVELSEN

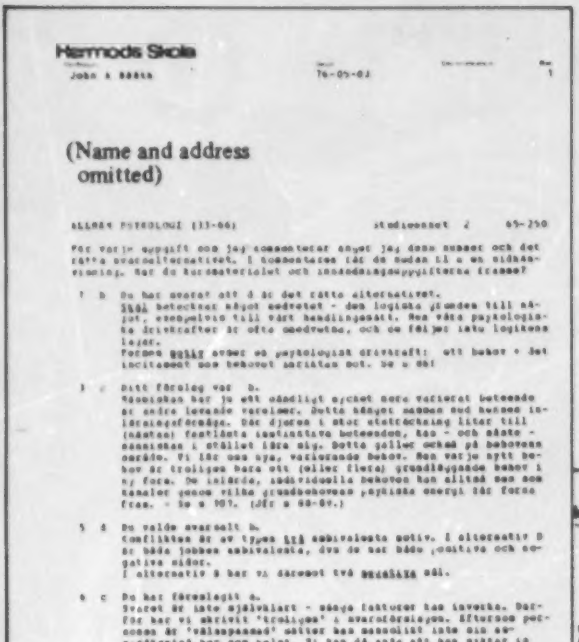
b) MAN HAR VÄNTAT ARGA PÅ NÅGONTING FÖRSTÄLLER SIG SAMMANBITET, MAN BITER I MOT TÄNDERNA HÅRT. MAN KANSKE BÖRJAR SKRIKER OCH SPÄNNER ÖGONBRYN EFTER SIG. ELLER ATT MAN GÖR SÅ BODA FÖRSLAG SOM TEX ENDON KAN FÅ SIG ETT SMÄLL. ELLER SOM MÅNGEN KASTA EN HASSA SAKER OMKRING SIG.
NÄR MAN HAR LUGNAT NER SIG SÅR MÅNGEN FÖRSTÄRKANDE TORT, MAN ÄR KANSKE RÄDDE ATT MAN KANSKE SKADAR OMKRING SIG. MÅNGA GRÅTER PÅGRA MAN INTE HAR LYCKAT UTTRYCKA KÄNSLAN.

8) 4 5 mm Välkommen med Er inbjudan
3 mm angående mitt nya arbete med att behandla Era ögon.

171

170

Appendix 4. Example of computer-generated comment letters, Psychology, General Course (computer-assisted version)



Hermods Skola

(Name and address omitted)

ALLMÄN PSYKOLOGI (33-06) Studieresultat 2 95-2?0

För varje uppgift som jag kommenterar anger jag dess nummer och det rätta svarsalternativet. I kommenteren här de enskilda frågorna.

1 b Du har svarat att b är det rätta alternativet.
Skälet betecknar något medfödet - den logiska grunden till nästan, respektive till vårt handlingssätt. Men våra psykologiska drivkrafter är ofta omedvetna, och de följer inte logikens lagar.
Termen motiv avser en psykologisk drivkraft: att bakom + det incitament som behovet skriftan mot. Se s 88!

3 c Ditt förslag var b.
Människan har ju ett oändligt mycket mera varierat beteende än andra levande varelser. Detta något mannen med hennes inlärningsförmåga. Där djuren i stor utsträckning lider till (mänskan) fastlåsta instinktiva beteenden, kan - och måste - människan i stället lära sig. Detta gäller också på behovens område. Vi lär oss nya, varierande behov. Men varje nytt behov är troligen bara ett (eller flera) grundbehovens behov i ny form. De inlärda, individuella behoven kan alltså sen som tänaler genom vilka grundbehovens psykiska energi får forsa fram. - Se s 307. (Jfr s 98-99.)

5 d Du valde svarsalt b.
Konflikten är av typen ett ambivalents motiv. I alternativ D är både jobben ambivalenta, dvs de har både positiva och negativa sidor.
I alternativ B har vi däremot två motsatta mål.

6 c Du har förenklat d.
Svaret är inte självklart - många faktorer kan inverka. Därför har vi skrivit 'troligen' i svarsalternativen. Eftersom personen är 'välanpassad' måttar han mentalhälsa inte din avsikt(ansvar) har som helst. Vi kan då anta att han sträcker sig på den grupp som han identifierar sig med. Troligen identifierar han sig med sin egna kamratgrupp (han är ju 'välanpassad').
Lyckas han av med detta stärker kanske hans självförtroende efter hand. - Jfr s 103-104!

8 d Du tycks att allt a var det rätta.
Vi är långtifrån alltid medvetna om våra motiv, allraminst de djupast drivande (jfr s 99). Men åtminstone ibland har vi inga större svårigheter att upptäcka drivkrafterna till vårt beteende (t.ex när det gäller sådana behov som hunger och törst).

Hermods Skola

2

Att inlärningen har stor betydelse för de individuella behoven är ju helt klart. Men även för de andra behoven spelar inlärningen stor roll. Se t ex s 89 (överst), 92, 95 och 98 (mest).

Frustrering, som behandlades i uppgift 9, är ett viktigt begrepp även i personlighetspsykologin. Samtliga psykologer anser att vår personlighet byggs upp med hjälp av frustreringar och utformas olika beroende på hur många och svåra frustreringar vi råkar ut för. Du kommer att få läsa om olika typer av reaktioner på frustreringar i enhet 9 (s 278-279).

11 d Du har svarat att b är det rätta alternativet.
Psykosomatiska reaktioner är sådana där en psykisk orsak har påtaglig (psykologisk) verkan. Stimulansbrist (som beskrivs i den här uppgiften) är ett uppenbart tydligt psykosomatiskt fenomen. Se s 125 - och särskilt övningsuppgift 221

Den s k psykosvaviska effekten är något annat: På grund av ökad svettning minskar avdunstningen av kroppens motstånd vid starka emotionella tillstånd.

12 a Ditt förslag var d.
Faktorerna kan studeras på tre olika sätt eller från tre utgångspunkter:
1 känsloupplevelserna
2 uttrycksrörelserna (mimik osv)
3 de fysiologiska förändringarna

(1) är helt privata. Den kan vi knappt nära som vår själva. (2) och (3) kan vi studera både hos oss själva och hos andra. Se s 109, nedersta och 110, överst. Jfr också s 111, stycket 'I forskningen av emotion ...'

13 d Du valde svarsalt b.
Först kommer de kroppsliga förändringarna ('vi darrar'), därefter själva känsloupplevelsen ('vi är rädda') som en följd av dessa kroppsliga förändringar. Detta är James och Langes teori. - Troligen är denna teori ensidig, och Cannons och Bards hypotalamusteori (bara) rätt. Se s 129-131!

16 b Du har förenklat d.
Inget behov är dominerande hos en känsla. Men känslor utlöser ofta behov. Blir vi t ex rycket ylade får vi kanske ett behov av att vina detta i handling - få ett jämförelsevärt, kraxa om någon, börja hjälpa o s v. Vidare uppkommer vi olika känslor beroende på om ett behov blir tillfredsställt eller ej. Se s 110, det stycke som följer efter övningsuppgift 2.

Av 16 möjliga har du 7 rätt.
Förra gången lyckades du bättre. Jag tycker därför att du nu ska dig en riktigt rejäl repetition, så att du inte får några onödiga luckor i dina kunskaper.

Ditt betyg blir 2.

Vänliga hälsningar

Hermods Skola ingår i Liber Grafiska AB

Appendix 5. Example of computer-generated comment letters, translated into English, Psychology of Management

Hermods Skola

John A Bäth | 78-09-14 | 1

(Name and address omitted)

THE PSYCHOLOGY OF MANAGEMENT Study unit 2 65-278

I hope the following comments can help you to understand that which may still be unclear to you in this study unit. Compare them with the wording of the assignment questions, and check in the course material according to the references you are given below.

We agreed in unit 1 (question 14) that it is important, during an interview, that the interviewee also can put forward his questions. In the same way, one ought to allow and even encourage questions during introduction and training. This, too, seems to be quite clear to you, judging from your answers to items 3 and 5 - good!

8 d You suggested a.
The requirements in all of the alternatives are, in themselves, reasonable. The important similarity between the example and the situation which often arises in a training context is, however, that one is not (sufficiently) clear about one's goal. - See p. 22-23.

10 a You chose alternative d.
It is important both that the student learn the right method, and that learning time is not too long. The effect of learning is, then, due to both the time it takes to learn, and the 'accuracy' of learning. - An introductory orientation about the aim of a learning task can increase the student's motivation, i.e. make him more interested and receptive to training. - See p. 27-29!

12 b You have suggested a.
It is important to specify the quality criteria and give information about these during training. A training unit cannot reasonably comprise all the elements of the work task. See p. 31-33.

Information is one of the key words in this unit. Item 10 dealt with the importance of initial/preparatory information. However, items 1 and 15 also dealt with employees' need for information in different situations. Do not ever overlook that need!

Out of 15 items you have scored 12.
As we know from the previous study unit, you may be able to do even better, but you have, on the whole, achieved the goal of this study unit.

Your grade is 3.

Best regards,

John A Bäth

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Appendix 6. Additional tables

Table 18. Data on participants who did not return the enrolment questionnaire.—For definitions of non-starters, dropouts, and completers, see section 1.6

Course/course version and experimental group	Sex		Study status			
	M	F	Non-starters	Other dropouts	Completers	Σ
YES I (H, comp.-ass.)	*15*	*8*	*22*	*1*		*23*
8 submissions	3	4	6	1		7
4 »	3	1	4			4
2 »	9	3	12			12
YES I (H, traditional)	*10*	*20*	*25*	*3*	*2*	*30*
8 submissions	3	10	11	2		13
4 »	5	5	8	1	1	10
2 »	2	5	6		1	7
Psychology, G.C. (comp.-ass.)	*7*	*8*	*13*	*1*	*1*	*15*
8 submissions	4	2	6			6
4 »	2	4	5	1		6
2 »	1	2	2		1	3
Psychology, G.C. (traditional)	*4*	*10*	*13*	*1*		*14*
8 submissions	1	2	2	1		3
4 »	2	3	5			5
2 »	1	5	6			6
Physics, E.C.	*20*	*12*	*26*	*2*	*4*	*32*
8 submissions	4	2	4	2		6
4 »	11	8	16		3	19
2 »	5	2	6		1	7
Advanced Economics	*21*	*9*	*28*	*2*		*30*
12 submissions	10	4	12	2		14
6 »	5	1	6			6
3 »	6	4	10			10
YES I (NKS)	*17*	*5*	*15*	*5*	*2*	*22*
8×12 ass.questions	3	2	4	1		5
8×6 »	3		1	2		3
4×12 »	6	2	6	1	1	8
4×6 »	5	1	4	1	1	6
Psychology of Management	*9*		*7*		*2*	*9*
4×16 ass.questions	1				1	1
4×8 »	1		1			1
2×16 »	1		1			1
2×8 »	6		5		1	6
Σ	*103*	*72*	*149*	*15*	*11*	*175*

Table 19. Sex distribution of students who returned the enrolment questionnaire. (n.s. = not significant; n.s. statements and p values refer to comparisons between experimental groups)

Course/course version and experimental group	M	F	Σ		
YES 1 (H, comp.-ass.)	*104*	*94*	*198*		
8 submissions	41	31	72	n.s.	
4 »	35	38	73		
2 »	28	25	53		n.s.
YES 1 (H, traditional)	*91*	*89*	*180*		
8 submissions	24	21	45		
4 »	43	32	75	n.s.	
2 »	24	36	60		
Psychology, G.C. (comp.-ass.)	*64*	*135*	*199*		
8 submissions	18	47	65	n.s.	
4 »	25	43	68		
2 »	21	45	66		n.s.
Psychology, G.C. (traditional)	*61*	*127*	*188*		
8 submissions	19	43	62		
4 »	18	38	56	n.s	
2 »	24	46	70		
Physics, E.C.	*98*	*63*	*161*		
8 submissions	43	17	60	$0.05 < p < 0.10$	
4 »	23	22	45		
2 »	32	24	56		
Advanced Economics	*229*	*62*	*291*		
12 submissions	76	24	100	$0.02 < p < 0.05$	
6 »	70	26	96		
3 »	83	12	95		
YES 1 (NKS)	*110*	*117*	*227*		
8x12 ass.questions	35	20	55		
8x6 »	26	34	60	$0.05 < p < 0.10$	
4x12 »	23	32	55		
4x6 »	26	31	57		
Psychology of Management	*99*	*32*	*131*		
4x16 ass.questions	30	7	37		
4x8 »	24	9	33	n.s.	
2x16 »	22	8	30		
2x8 »	23	8	31		
Σ	*856*	*719*	*1575*		

Table 20. Age distribution of students who returned the enrolment questionnaire. (n.s. statements refer to comparisons between experimental groups)

Course/course version and experimental group	Age ⩽ 20	21-30	31-40	41-50	> 50	Σ	
YES 1 (H, comp.-ass.)	*7*	*53*	*62*	*38*	*38*	*198*	
8 submissions	3	22	16	18	13	72	n.s.
4 ➢	3	20	25	12	13	73	
2 ➢	1	11	21	8	12	53	
YES 1 (H, traditional)	*8*	*48*	*55*	*34*	*35*	*180*	n.s.
8 submissions		9	11	11	14	45	
4 ➢	4	21	23	13	14	75	n.s.
2 ➢	4	18	21	10	7	60	
Psychology, G.C. (comp.-ass.)	*46*	*67*	*51*	*22*	*11*	*197*	
8 submissions	13	22	18	7	4	64	
4 ➢	19	20	19	7	2	67	n.s.
2 ➢	14	25	14	8	5	66	
Psychology, G.C. (traditional)	*40*	*84*	*40*	*15*	*8*	*187*	n.s.
8 submissions	12	32	13	4		61	
4 ➢	14	26	9	6	1	56	n.s.
2 ➢	14	26	18	5	7	70	
Physics, E.C.	*22*	*71*	*43*	*19*	*5*	*160*	
8 submissions	7	28	16	6	3	60	
4 ➢	9	20	11	5		45	n.s.
2 ➢	6	23	16	8	2	55	
Advanced Economics	*67*	*176*	*37*	*6*	*1*	*287*	
12 submissions	23	59	15	3		100	
6 ➢	25	59	9	1		94	n.s.
3 ➢	19	58	13	2	1	93	
YES 1 (NKS)	*17*	*66*	*73*	*42*	*29*	*227*	
8×12 ass.questions	2	13	19	10	11	55	
8×6 ➢	7	19	21	6	7	60	n.s.
4×12 ➢	2	18	15	12	8	55	
4×6 ➢	6	16	18	14	3	57	
Psychology of Management	*5*	*64*	*41*	*14*	*7*	*131*	
4×16 ass.questions	1	19	11	4	2	37	
4×8 ➢	1	13	12	6	1	33	n.s.
2×16 ➢	2	16	6	2	4	30	
2×8 ➢	1	16	12	2		31	
Σ	*212*	*629*	*402*	*190*	*134*	*1567*	

Table 21. Educational level of students who returned the enrolment questionnaire. (n.s. statements and p values refer to comparisons between experimental groups)

Course/course version and experimental group	Educational level 1	2	3	4	5	Σ	
YES I (H, comp.-ass.)	*109*	*34*	*34*	*21*		*198*	
8 submissions	40	14	11	7		72	n.s.
4 »	36	14	16	7		73	
2 »	33	6	7	7		53	
YES I (H, traditional)	*97*	*19*	*47*	*17*		*180*	$0.05 < p < 0.10$
8 submissions	30	4	8	3		45	
4 »	37	6	25	7		75	n.s.
2 »	30	9	14	7		60	
Psychology, G.C. (comp.-ass.)	*45*	*71*	*45*	*36*	*2*	*199*	
8 submissions	13	23	17	11	1	65	n.s.
4 »	16	29	10	12	1	68	
2 »	16	19	18	13		66	
Psychology, G.C. (traditional)	*36*	*85*	*37*	*29*	*1*	*188*	n.s.
8 submissions	15	28	10	9		62	
4 »	8	27	12	9		56	n.s.
2 »	13	30	15	11	1	70	
Physics, E.C.	*53*	*57*	*35*	*11*	*5*	*161*	
8 submissions	20	21	14	12	3	60	n.s.
4 »	15	18	8	4		45	
2 »	18	18	13	5	2	56	
Advanced Economics	*11*	*12*	*201*	*61*	*5*	*290*	
12 submissions	5	2	69	22	2	100	n.s.
6 »	4	3	70	18		95	
3 »	2	7	62	21	3	95	
YES I (NKS)	*142*	*25*	*54*	*3*	*3*	*227*	
8×12 ass.questions	35	5	11	2	2	55	
8×6 »	40	5	15			60	n.s.
4×12 »	36	5	12	1	1	55	
4×6 »	31	10	16			57	
Psychology of M.	*35*	*20*	*30*	*38*	*8*	*131*	
4×16 ass.questions	10	8	4	13	2	37	
4×8 »	10	2	9	11	1	33	$0.05 < p < 0.10$
2×16 »	11	4	5	9	1	30	
2×8 »	4	6	12	5	4	31	
Σ	*528*	*323*	*483*	*216*	*24*	*1524*	

Educational level 1: Sw. and Norw. – elementary school
Brit. – no school examination
2: Sw. – comprehensive school (realskola or grundskola)
Norw. – comprehensive school (realskola or 9 years' folkskole, høyeste)
Brit. – CSE
3: Sw. and Norw. – vocational school or corresponding
Brit. – GCE, O level
4: Sw. and Norw. – upper secondary school
Brit. – GCE, A level
5: University or corresponding

Table 22. Previous correspondence study, according to answers to the enrolment questionnaire. (n.s. statements and p values refer to comparisons between experimental groups)

Course/course version and experimental group	Previously taken a correspondence course				
	Yes	No	Σ		
YES 1 (H, comp.-ass.)	*74*	*122*	*196*		
8 submissions	28	44	72	n.s.	n.s.
4 »	23	48	71		
2 »	23	30	53		
YES 1 (H, traditional)	*75*	*105*	*180*		
8 submissions	21	24	45	n.s.	
4 »	34	41	75		
2 »	20	40	60		
Psychology, G.C. (comp.-ass.)	*76*	*123*	*199*		
8 submissions	29	36	65	n.s.	n.s.
4 »	26	42	68		
2 »	21	45	66		
Psychology, G.C. (traditional)	*76*	*111*	*187*		
8 submissions	21	41	62	n.s.	
4 »	20	35	55		
2 »	35	35	70		
Physics, E.C.	*84*	*77*	*161*		
8 submissions	34	26	60	n.s.	
4 »	25	20	45		
2 »	25	31	56		
Advanced Economics	*44*	*246*	*290*		
12 submissions	20	79	99	$0.05 < p < 0.10$	
6 »	8	88	96		
3 »	16	79	95		
YES 1 (NKS)	*93*	*131*	*224*		
8×12 ass.questions	29	26	55		
8×6 »	20	39	59	n.s.	
4×12 »	20	34	54		
4×6 »	24	32	56		
Psychology of Management	*56*	*75*	*131*		
4×16 ass.questions	15	22	37		
4×8 »	21	12	33	$0.02 < p < 0.05$	
2×16 »	10	20	30		
2×8 »	10	21	31		
Σ	*578*	*990*	*1568*		

Table 23. Parallel correspondence studies, according to answers to the enrolment questionnaire. (n.s. statements and p values refer to comparisons between experimental groups)

Course/course version and experimental group	Taking another correspondence course simultaneously			
	Yes	No	Σ	
YES 1 (H, comp.-ass.)	*24*	*174*	*198*	
8 submissions	6	66	72	n.s.
4 »	11	62	73	
2 »	7	46	53	
YES 1 (H, traditional)	*27*	*153*	*180*	n.s.
8 submissions	7	38	45	
4 »	11	64	75	n.s.
2 »	9	51	60	
Psychology, G.C. (comp.-ass.)	*39*	*160*	*199*	
8 submissions	14	51	65	n.s.
4 »	14	54	68	
2 »	11	55	66	
Psychology, G.C. (traditional)	*51*	*137*	*188*	n.s.
8 submissions	15	47	62	
4 »	15	41	56	n.s.
2 »	21	49	70	
Physics, E.C.	*68*	*93*	*161*	
8 submissions	24	36	60	
4 »	20	25	45	n.s.
2 »	24	32	56	
Advanced Economics	*70*	*221*	*291*	
12 submissions	24	76	100	
6 »	24	72	96	n.s.
3 »	22	73	95	
YES 1 (NKS)	*21*	*205*	*226*	
8x12 ass.questions	5	50	55	
8x6 »	8	51	59	n.s.
4x12 »	2	53	55	
4x6 »	6	51	57	
Psychology of Management	*36*	*95*	*131*	
4x16 ass.questions	16	21	37	
4x8 »	4	29	33	$0.02 < p < 0.05$
2x16 »	7	23	30	
2x8 »	9	22	31	
Σ	*336*	*1238*	*1574*	

Table 24. Motives for studying, according to answers to the enrolment questionnaire. (n.s. statements and p values refer to comparisons between experimental groups)

Course/course version and experimental group	Type of motivation M1	M2	M3		
YES 1 (H, comp.-ass.)	*3.27*	*2.98*	*2.11*		
8 submissions	3.21	2.93	2.08	M1: n.s.	
4 »	3.27	3.02	2.15	M2: n.s.	
2 »	3.35	2.99	2.12	M3: n.s.	M1: 0.02 < < p < 0.05
YES 1 (H, traditional)	*3.39*	*3.10*	*2.13*		M2: n.s.
8 submissions	3.44	3.17	2.22	M1: n.s.	M3: n.s.
4 »	3.44	3.10	2.19	M2: n.s.	
2 »	3.29	3.05	1.98	M3: 0.05 < < p < 0.10	
Psychology, G.C. (comp.-ass.)	*3.36*	*2.70*	*1.76*		
8 submissions	3.42	2.89	1.79	M1: n.s.	
4 »	3.38	2.41	1.79	M2: 0.05 <	
2 »	3.27	2.41	1.71	< p < 0.10	M1: n.s.
Psychology, G.C. (traditional)	*3.29*	*2.63*	*1.80*	M3: n.s.	M2: n.s.
8 submissions	3.21	2.73	1.73	M1: n.s.	M3: n.s.
4 »	3.27	2.68	1.88	M2: n.s.	
2 »	3.36	2.51	1.80	M3: n.s.	
Physics, E.C.	*3.51*	*2.05*	*2.19*		
8 submissions	3.52	2.01	2.22	M1: n.s.	
4 »	3.45	2.06	2.15	M2: n.s.	
2 »	3.55	2.09	2.18	M3: n.s.	
Advanced Economics	*3.49*	*1.80*	*2.43*		
12 submissions	3.48	1.78	2.44	M1: n.s.	
6 »	3.55	1.84	2.50	M2: n.s.	
3 »	3.46	1.79	2.33	M3: n.s.	
YES 1 (NKS)	*3.36*	*3.03*	*2.08*		
8 x 12 ass.questions	3.38	3.03	2.19	M1: n.s.	
8 x 6 »	3.25	2.99	2.02	M2: n.s.	
4 x 12 »	3.47	3.06	2.06	M3: n.s.	
4 x 6 »	3.37	3.06	2.07		
Psychology of Management	*3.58*	*2.31*	*2.08*		
4 x 16 ass.questions	3.52	2.36	1.98	M1: n.s.	
4 x 8 »	3.59	2.36	2.11	M2: n.s.	
2 x 16 »	3.64	2.34	2.24	M3: n.s.	
2 x 8 »	3.57	2.30	2.00		

M1 = "Social motivation"
M2 = Extrinsic motivation
M3: Intrinsic motivation

Table 25. Motives for choosing correspondence study, according to answers to the enrolment questionnaire. (n.s. statements and p values refer to comparisons between experimental groups)

Course/course version and experimental groups	Type of motives A	B	C		
YES 1 (H, comp.-ass.)	*2.00*	*3.58*	*2.49*		
8 submissions	1.91	3.69	2.63	A: n.s.	
4 »	2.04	3.48	2.43	B: n.s.	
2 »	2.06	3.57	2.39	C: n.s.	A: n.s.
YES 1 (H, traditional)	*2.11*	*3.68*	*2.76*		B: $0.05 < p < 0.10$
8 submissions	2.23	3.65	2.68	A: n.s.	C: $0.05 < p < 0.10$
4 »	2.11	3.76	2.90	B: n.s.	
2 »	2.03	3.63	2.63	C: n.s.	
Psychology, G.C. (comp.-ass.)	*2.03*	*3.53*	*2.89*		
8 submissions	2.02	3.57	2.85	A: n.s.	
4 »	2.04	3.58	2.85	B: n.s.	
2 »	2.02	3.45	2.98	C: n.s.	A: n.s.
Psychology, G.C. (traditional)	*2.01*	*3.54*	*2.62*		B: n.s.
8 submissions	2.03	3.52	2.63	A: n.s.	C: $0.02 < p < 0.05$
4 »	2.04	3.57	2.78	B: n.s.	
2 »	1.97	3.54	2.47	C: n.s.	
Physics, E.C.	*2.25*	*3.35*	*2.43*		
8 submissions	2.17	3.31	2.33	A: n.s.	
4 »	2.31	3.53	2.80	B: n.s.	
2 »	2.28	3.26	2.25	C: $0.05 < p < 0.10$	
Advanced Economics	*2.32*	*3.62*	*2.77*		
12 submissions	2.31	3.63	2.79	A: n.s.	
6 »	2.38	3.57	2.80	B: n.s.	
3 »	2.28	3.65	2.73	C: n.s.	
YES 1 (NKS)	*2.01*	*3.52*	*2.92*		
8×12 ass.questions	1.98	3.45	2.85	A: n.s.	
8×6 »	1.91	3.52	3.09	B: n.s.	
4×12 »	2.14	3.50	2.92	C: n.s.	
4×6 »	2.04	3.61	2.81		
Psychology of Management	*2.27*	*3.39*	*2.57*		
4×16 ass.questions	2.16	3.31	2.24	A: n.s.	
4×8 »	2.32	3.42	2.84	B: n.s.	
2×16 »	2.31	3.40	2.72	C: n.s.	
2×8 »	2.29	3.45	2.55		

Motive type A: Supposed advantages of the study form
B: External conditions (employer or geographical circumstances)
C: Difficulties to combine one's work with another study form

Table 27. Total droupout from the experiments: Cause of data loss, and sex

Course/course version and experimental group	Cause of data loss					Sex		
	1	2	3	4	5	M	F	Σ
YES I (H, comp.-ass.)	*11*	*1*				*7*	*5*	*12*
8 submissions	6	1				6	1	7
4 »	5					1	4	5
2 »								
YES I (H, traditional)	*4*	*4*			*2*	*6*	*4*	*10*
8 »	2	1			2	4	1	5
4 »	1	2				1	2	3
2 »	1	1				1	1	2
Psychology, G.C. (comp.-ass.)			*1*				*1*	*1*
8 submissions								
4 »			1				1	1
2 »								
Psychology, G.C. (traditional)	*7*					*4*	*3*	*7*
8 submissions	3					3		3
4 »	1					1		1
2 »	3						3	3
Physics, E.C.	*13*					*7*	*6*	*13*
8 submissions	3					3		3
4 »	5					2	2	5
2 »	5					2	3	5
Advanced Economics	*1*			*1*		*2*		*2*
12 submissions	1			1		2		2
6 »								
3 »								
YES I (NKS)	*1*	*4*	*4*	*1*		*7*	*3*	*10*
8x12 ass.questions		1	3	1		3	1	4
8x6 »		1	1			2		2
4x12 »	1	1				1	2	3
4x6 »		1				1		1
Psychology of Management								
4x16 ass.questions								
4x8 »								
2x16 »								
2x8 »								
Σ	*37*	*9*	*5*	*2*	*2*	*33*	*22*	*55*

Cause of data loss

1 – Course material returned by the addressee (36 cases) or by the Post Office (1 case, RRC)
2 – Too young (< 18 years old)
3 – Changed from computer-assisted two-way communication to traditional (4 cases) or from pure correspondence education to correspondence education combined with face-to-face teaching (1 case)
4 – Changed to another course
5 – Probably suffering from psychotic disorder (1 case); deceased during the experiment (1 case)

Table 30. Completers who did not return the final questionnaire, distributed on a number of enrolment questionnaire variables

Course/course version	Sex		Age					Educational level					Previous corresp. study		Parallel corresp. study		Σ
	M	F	1	2	3	4	5	1	2	3	4	5	Yes	No	Yes	No	
YES 1 (H, comp.-ass.)	2	2		1		1	2	1	2	1			2	2		4	4
YES 1 (H, traditional)	7	11		7	4	3	4	6	3	8	1		8	10	3	15	18[1]
Psychology, G.C. (comp.-ass.)																	
Psychology, G.C. (traditional)		2		1	1			1	1					2	1	1	2
Physics, E.C.	4	2		3	1	2		1	2	1		2	4	2	2	4	7
YES 1 (NKS)	6	3		1	5	1	2	6	1	1		1	5	4		9	9
Psychology of Management	4	1		2	2	1		2	1	1	1		2	3	1	4	5

Age
1 ⩽ 20
2 21–30
3 31–40
4 41–51
5 > 50

Educational level
1 Elementary school
2 Sw. – comprehensive school (realskola or grundskola)
Norw – comprehensive school (realskola or 9 years' folkskole, høyeste)
3 Vocational school or corresponding
4 Upper secondary school
5 University or corresponding

1) As regards one student, data are missing also from the enrolment questionnaire

Table 31. Completers who did not take the final test, distributed on a number of enrolment questionnaire variables

Course/course version	Sex		Age					Educational level					Previous corresp. study		Parallel corresp. study		Σ
	M	F	1	2	3	4	5	1	2	3	4	5	Yes	No	Yes	No	
YES 1 (H, comp.-ass.)	3	3		2		1	3	2	2	2			4	2		6	6
YES 1 (H, traditional)	7	12		7	4	3	5	7	3	8	1		9	10	3	16	19[1]
Psychology, G.C. (comp.-ass.)	1	2		2	1			1	1	1			1	2	1	2	3
Psychology, G.C. (traditional)		3		2	1				1	1	1		1	2	1	2	3
Physics, E.C.	4	2		3	1	2		1	2	1		2	4	2	2	4	6
YES 1 (NKS)	6	2		1	4	1	2	5	1	1		1	5	3		8	8
Psychology of Management	3			2	1			1		1	1		1	2	1	2	3

For explanations, see *table 30*.

Table 32. Completers who did not return the final questionnaire, distributed on a number of enrolment questionnaire variables. YES 1 (H, traditional), experimental groups

Experimental group	Sex		Age					Educational level					Previous corresp. study		Parallel corresp. study		Σ
	M	F	1	2	3	4	5	1	2	3	4	5	Yes	No	Yes	No	
8 submissions		3		1	1	1		3					2	1		3	3
4 submissions	3	3		1	1	1	3	2		3	1		4	2		6	6
2 submissions	4	5		5	2	1	1	1	3	5			2	7	3	6	9[1]
Σ	7	11		7	4	3	4	6	3	8	1		8	10	3	15	18

For explanations, see *table 30*.

Table 33. Completers who did not take the final test, distributed on a number of enrolment questionnaire variables. YES 1 (H, traditional), experimental groups

Experimental group	Sex		Age					Educational level					Previous corresp. study		Parallel corresp. study		Σ
	M	F	1	2	3	4	5	1	2	3	4	5	Yes	No	Yes	No	
8 submissions		3		1	1	1		3					2	1		3	3
4 submissions	3	4		1	1	1	4	3		3	1		5	2		7	7
2 submissions	4	5		5	2	1	1	1	3	5			2	7	3	6	9[1]
Σ	7	12		7	4	3	5	7	3	8	1		9	10	3	16	19

For explanations, see *table 30*.

Table 4.2. Completers and non-completers, experiments according to design 1: Attitude towards the course as a whole. (Non-completers = those non-completers who returned the dropout questionnaire and had started studying the course; in all, 283 students)

Course/course version	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (H, comp.-ass.)	1	9	52	3	1	66	2.90	1	6	31	10	3	51	3.16
YES 1 (H, traditional)	1	2	27	2		32	2.94	1	2	55	2	2	62	3.03
Psychology, G.C. (comp.-ass.)	3	13	51	1	1	69	2.77	2	3	37	11	5	58	3.24
Psychology, G.C. (traditional)	1	8	27	1	1	38	2.82	1	6	42	14	6	69	3.26
Physics, E.C.	6	17	51	3		77	2.66	1	4	20	5	1	31	3.03
Σ	12	49	208	10	3	282	2.80	6	21	185	42	17	271	3.16

Table 4.3. Completers and non-completers, experiments according to design 1: Overall attitude towards correspondence education. (Non-completers = those non-completers who returned the dropout questionnaire and had worked through at least about one quarter of the course material; in all, 215 students)

Course/course version	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (H, comp.-ass.)	29	24	9	2	2	66	1.85	12	8	7	5		32	2.16
YES 1 (H, traditional)	13	16	3			32	1.69	17	21	8	2	2	50	2.02
Psychology, G.C. (comp.-ass.)	39	26	2	2		69	1.52	6	25	8	7		46	2.35
Psychology, G.C. (traditional)	21	15	1	1		38	1.53	6	17	9	6	2	40	2.53
Physics, E.C.	35	33	7	2		77	1.69	8	13	3	2		26	1.96
Σ	137	114	22	7	2	282	1.66	49	84	35	22	4	194	2.22

Table 4.5. Completers and non-completers, experiments according to design 1: Attitude towards the statement "They [= the assignments for submission] made my study work more pleasant and stimulating". (Non-completers = those non-completers who returned the dropout questionnaire and had submitted at least some assignment for scrutiny; in all, 137 students)

Course/course version	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (H, comp.-ass.)	34	27	3	1		65	1.55	6	9	5	1		21	2.05
YES 1 (H, traditional)	13	15	3	1		32	1.75	16	15	7	1		39	1.82
Psychology, G.C. (comp.-ass.)	37	25	7	1		70	1.60	8	7	8	2	1	26	2.27
Psychology, G.C. (traditional)	18	14	4	1	1	38	1.76	7	7	4	2	1	21	2.19
Physics, E.C.	38	27	11	1		77	1.68	6	7	2	2		17	2.00
Σ	140	108	28	5	1	282	1.65	43	45	26	8	2	124	2.08

Table 4.7. Completers and non-completers, experiments according to design 1: Attitude towards the statement "With the tutor's correction of and comments on my answers I am ..." (1 = "very satisfied", 5 = "very dissatisfied"). (Non-completers, see *table 4.5*)

Course/course version	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (H, comp.-ass.)	55	10	1			66	1.18	12	7	4	1		24	1.75
YES 1 (H, traditional)	21	6	5			32	1.50	22	12	1	1	1	37	1.57
Psychology, G.C. (comp.-ass.)	46	16	7	1		70	1.47	11	11	2		1	25	1.76
Psychology, G.C. (traditional)	13	12	10	1	1	37	2.05	4	12	3	2		21	2.14
Physics, E.C.	42	28	4	3		77	1.58	13	3		1		17	1.35
Σ	177	72	27	5	1	282	1.51	62	45	10	5	2	124	1.71

Table 49. Completers and non-completers, experiments according to design 1: Attitude towards the statement "In this course, there should be more submissions". (Non-completers, see *table 42*)

Course/course version and experimental group	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (H, comp.-ass.)	*4*	*11*	*21*	*24*	*5*	*65*	*3.23*	*6*	*7*	*8*	*15*	*10*	*46*	*3.35*
8 submissions	1	2	8	11	3	25	3.44	1	1	4	5	3	14	3.57
4 ▸	1	7	6	8	1	23	3.04	1		4	5	5	15	3.87
2 ▸	2	2	7	5	1	17	3.06	4	6		5	2	17	2.71
YES 1 (H, traditional)	*3*	*11*	*8*	*5*	*3*	*30*	*2.80*	*4*	*12*	*15*	*17*	*14*	*62*	*3.40*
8 submissions		1		2	2	5	3.20		4	5	3	5	17	3.53
4 ▸	1	3	3	3	1	11	3.00		6	9	8	5	28	3.43
2 ▸	2	7	5			14	2.21	4	2	1	6	4	17	3.24
Psychology, G.C. (comp.-ass.)	*13*	*21*	*18*	*11*	*7*	*70*	*2.71*	*10*	*10*	*16*	*11*	*9*	*56*	*2.98*
8 submissions	3	6	7	4	4	24	3.00	3	1	6	4	6	20	3.45
4 ▸	4	7	3	4	2	20	2.65	2	5	7	6	2	22	3.05
2 ▸	6	8	8	3	1	26	2.42	5	4	3	1	1	14	2.21
Psychology, G.C. (traditional)	*5*	*9*	*7*	*11*	*6*	*38*	*3.11*	*14*	*12*	*20*	*18*	*2*	*66*	*2.73*
8 submissions		3	2	4	6	15	3.87	1	2	7	7	1	18	3.28
4 ▸	2	2	2	3		9	2.67	7	3	8	5	1	24	2.58
2 ▸	3	4	3	4		14	2.79	6	7	5	6		24	2.46
Physics, E.C.	*9*	*14*	*24*	*22*	*7*	*76*	*3.05*	*3*	*5*	*10*	*9*	*3*	*30*	*3.13*
8 submissions	1	3	10	8	5	27	3.48			5	8	1	14	3.71
4 ▸	2	2	9	9	2	24	3.29	1	2	3		1	7	2.71
2 ▸	6	9	5	5		25	2.36	2	3	2	1	1	9	2.56
Σ	*34*	*66*	*78*	*73*	*28*	*279*	*2.98*	*37*	*46*	*69*	*70*	*38*	*260*	*3.10*

Table 51. Completers and non-completers, experiments according to design 1: The feeling of isolation in the study situation. (Non-completers, see *table 43*)

Course/course version	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (H, comp.-ass.)	2	16	6	18	23	65	3.68	3	12	4	8	6	33	3.06
YES 1 (H, traditional)		10	4	11	7	32	3.47	1	15	7	12	15	50	3.50
Psychology, G.C. (comp.-ass.)	2	22	7	19	19	69	3.45	3	17	7	11	8	46	3.09
Psychology, G.C. (traditional)	1	11	7	13	6	38	3.32	5	19	5	9	2	40	2.60
Physics, E.C.	3	20	11	21	22	77	3.51		8	5	8	5	26	3.38
Σ	8	79	35	82	77	281	3.50	12	71	28	48	36	195	3.13

Table 53. Completers and non-completers, experiments according to design 1: Attitude to the statement "There should be an opportunity of meeting the correspondence tutor or another teacher sometimes to get some oral instruction". (Non-completers, see *table 42*)

Course/course version	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (H, comp.-ass.)	7	21	29	6	1	64	2.58	13	12	10	7	5	47	2.55
YES 1 (H, traditional)	6	11	11	2		30	2.30	13	18	18	7	6	62	2.60
Psychology, G.C. (comp.-ass.)	10	24	27	6	3	70	2.69	18	19	11	7	4	59	2.32
Psychology, G.C. (traditional)	7	17	9	2	3	38	2.39	22	19	17	7	2	67	2.22
Physics, E.C.	15	31	20	9	2	77	2.38	11	6	13		4	34	2.41
Σ	45	104	96	25	9	279	2.44	77	74	69	28	21	269	2.41

Table 65. Completers and non-completers, experiments according to design 2: Attitude towards the course as a whole. (Non-completers = those non-completers who returned the dropout questionnaire and had started studying the course, in all, 71 students)

Course/course version	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (NKS)	16	10	62	2		91	2.56	2	5	35	7		49	2.96
Psychology of Management	7	22	52	4	1	86	2.65		1	10	3		14	3.14
Σ	23	32	115	6	1	177	2.50	2	6	45	10		63	3.00

Table 66. Completers and non-completers, experiments according to design 2: Overall attitude towards correspondence education. (Non-completers = those non-completers who returned the dropout questionnaire and had worked through at least about a quarter of the course material, in all, 63 students)

Course/course version	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (NKS)	50	36	6		1	91	1.55	11	23	5	4		43	2.05
Psychology of Management	51	31	3	2		87	1.49		4	2	2		8	2.75
Σ	101	65	9	2	1	178	1.52	11	27	7	6		51	2.16

Table 68. Completers and non-completers, experiments according to design 2: Attitude towards the statement "They [= the assignments for submission] made my study work more pleasant and stimulating". (Non-completers = those non-completers who returned the dropout questionnaire and had submitted at least some assignment for scrutiny; in all, 49 students)

Course/course version	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (NKS)	50	29	11	1		91	1.59	15	16	6	1		38	1.82
Psychology of Management	51	30	5		1	87	1.56		7				7	2.00
Σ	101	59	16	1	1	178	1.55	15	23	6	1		45	1.84

Table 70. Completers and non-completers, experiments according to design 2: Attitude towards the statement "With the tutor's corrections of and comments on my answers I am . . ." (1 = "very satisfied", 5 = "very dissatisfied"). (Non-completers, see *table 68*)

Course/course version	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (NKS)	63	21	6	1		91	1.40	24	7	5	1	1	38	1.63
Psychology of Management	63	19	3	2		87	1.36	2	2	2			6	2.00
Σ	126	40	9	3		178	1.38	26	9	7	1	1	44	1.68

Table 72. Completers and non-completers, experiments according to design 2: Attitude towards the statement "In this course, there should be more assignment questions per submission". (Non-completers, see *table 65*)

Course/course version and experimental group	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (NKS)	*6*	*29*	*23*	*22*	*11*	*91*	*3.03*	*3*	*4*	*20*	*14*	*12*	*53*	*3.53*
8×12 ass.questions	1	3	10	7	3	24	3.33			2	8		10	3.80
8×6 »	2	8	6	3	1	20	2.65	1	2	6	1	4	14	3.36
4×12 »	1	11	3	7	6	28	3.21	1		4	2	3	10	3.60
4×6 »	2	7	4	5	1	19	2.19	1	2	8	3	5	19	3.47
Psychology of Management	*12*	*21*	*18*	*32*	*4*	*87*	*2.94*		*1*	*3*	*3*	*6*	*13*	*4.08*
4×16 ass.questions	2	2	9	10	1	24	3.25			2		1	3	3.67
4×8 »	1	9	4	9	1	24	3.00				2	2	4	4.50
2×16 »	2	6	1	9	1	19	3.05			1		2	3	4.33
2×8 »	7	4	4	4	1	20	2.40		1		1	1	3	3.67
Σ	*18*	*50*	*41*	*54*	*15*	*178*	*2.99*	*3*	*5*	*23*	*17*	*18*	*66*	*3.64*

Table 74. Completers and non-completers, experiments according to design 2. Attitude towards the statement "The assignments for submission could just as well be replaced by self-check exercises with model answers". (Non-completers, see *table 65*)

Course/course version and experimental group	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (NKS)	*2*	*6*	*26*	*28*	*28*	*90*	*3.82*	*6*	*7*	*21*	*11*	*9*	*54*	*3.19*
8x12 ass questions			7	6	11	24	4.17	1	1	4	4	1	11	3.27
8x6 »		2	7	6	5	20	3.70	3	2	5	3	1	14	2.79
4x12 »	1	2	9	7	8	27	3.70		3	2	2	3	10	3.50
4x6 »	1	2	3	9	4	19	3.68	2	1	10	2	4	19	3.26
Psychology of Management		*4*	*21*	*30*	*32*	*87*	*4.03*		*3*	*5*	*3*	*2*	*13*	*3.31*
4x16 ass questions		1	5	11	7	24	4.00		1	1	1		3	3.00
4x8 »		1	8	6	9	24	3.96			3		1	4	3.50
2x16 »		2	2	8	7	19	4.05		2	1			3	2.33
2x8 »			6	5	9	20	4.15				2	1	3	4.33
Σ	*2*	*10*	*47*	*58*	*60*	*177*	*3.93*	*6*	*10*	*26*	*14*	*11*	*67*	*3.21*

Table 76. Completers and non-completers, experiments according to design 2. The feeling of isolation in the study situation. (Non-completers, see *table 66*)

Course/course version	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (NKS)		11	6	39	35	91	4.08	1	8	3	18	14	44	4.27
Psychology of Management	1	13	5	23	44	86	4.12		1	1	6		8	3.63
Σ	1	24	11	62	79	177	4.10	1	9	4	24	14	52	4.17

Table 78. Completers and non-completers: Attitude towards the statement "There should be an opportunity of meeting the correspondence tutor or another teacher sometimes to get some oral instruction". (Non-completers, see *table 65*)

Course/course version	Completers							Non-completers						
	1	2	3	4	5	Σ	M	1	2	3	4	5	Σ	M
YES 1 (NKS)	16	37	26	9	3	91	2.41	11	20	13	5	3	52	2.40
Psychology of Management	12	26	30	11	8	87	2.74		6	4	2	1	13	2.85
Σ	28	63	56	20	11	178	2.57	11	26	17	7	4	65	2.49